

AD-A240 083



2

THE BIRTH OF MODERN COUNTERFIRE:
THE BRITISH AND AMERICAN EXPERIENCE IN WORLD WAR I

A thesis presented to the Faculty of the U.S. Army
Command and General Staff College in partial
fulfillment of the requirements for the
degree

MASTER OF MILITARY ART AND SCIENCE

by

WILLIAM M. CAMPSEY, MAJ, USA
B.S., United States Military Academy,
West Point, New York, 1975

Fort Leavenworth, Kansas
1991

Approved for public release; distribution is unlimited.

91-09603



REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
<small>Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503</small>				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE 7 June 1991	3. REPORT TYPE AND DATES COVERED Master's Thesis, 8-1990 to 6-1991	
4. TITLE AND SUBTITLE The Birth of Modern Counterfire: The British and American Experience in World War I			5. FUNDING NUMBERS	
6. AUTHOR(S) Major William M. Campsey				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army Command and General Staff College ATTN: ATZL-SWD-GD Fort Leavenworth, Kansas 6602706900			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSORING / MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution unlimited.			12b. DISTRIBUTION CODE A	
13. ABSTRACT (Maximum 200 words) This study investigates the original needs for and development of counterfire techniques in World War I. Concentrating on the experiences of the British and the Americans, the examination explores techniques of counterfire and their failures or successes. The study concludes that several techniques were necessary in World War I to suppress enemy artillery. First, efforts to destroy enemy artillery before battles were not as successful as efforts to neutralize it for the duration of the battle. Second, the enormity of details made competent staff work critical. Third, the intelligence procedures developed in position warfare were insufficient to suppress enemy artillery as the battle line moved forward. Finally, artillery organization and control must be centralized. The study also identifies two techniques necessary to exploit successful counterfire. First, surprise over the enemy would invariably gain the initiative. Second, counterfire must be integrated into the overall fire plan and the infantry scheme of maneuver.				
14. SUBJECT TERMS Counterfire; World War I; Artillery			15. NUMBER OF PAGES 105	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED	20. LIMITATION OF ABSTRACT SAR	

GENERAL INSTRUCTIONS FOR COMPLETING SF 298

The Report Documentation Page (RDP) is used in announcing and cataloging reports. It is important that this information be consistent with the rest of the report, particularly the cover and title page. Instructions for filling in each block of the form follow. It is important to *stay within the lines* to meet optical scanning requirements.

Block 1. Agency Use Only (Leave blank).

Block 2. Report Date. Full publication date including day, month, and year, if available (e.g. 1 Jan 88). Must cite at least the year.

Block 3. Type of Report and Dates Covered. State whether report is interim, final, etc. If applicable, enter inclusive report dates (e.g. 10 Jun 87 - 30 Jun 88).

Block 4. Title and Subtitle. A title is taken from the part of the report that provides the most meaningful and complete information. When a report is prepared in more than one volume, repeat the primary title, add volume number, and include subtitle for the specific volume. On classified documents enter the title classification in parentheses.

Block 5. Funding Numbers. To include contract and grant numbers; may include program element number(s), project number(s), task number(s), and work unit number(s). Use the following labels:

C - Contract	PR - Project
G - Grant	TA - Task
PE - Program Element	WU - Work Unit Accession No.

Block 6. Author(s). Name(s) of person(s) responsible for writing the report, performing the research, or credited with the content of the report. If editor or compiler, this should follow the name(s).

Block 7. Performing Organization Name(s) and Address(es). Self-explanatory.

Block 8. Performing Organization Report Number. Enter the unique alphanumeric report number(s) assigned by the organization performing the report.

Block 9. Sponsoring/Monitoring Agency Name(s) and Address(es). Self-explanatory.

Block 10. Sponsoring/Monitoring Agency Report Number. (If known)

Block 11. Supplementary Notes. Enter information not included elsewhere such as: Prepared in cooperation with...; Trans. of...; To be published in... When a report is revised, include a statement whether the new report supersedes or supplements the older report.

Block 12a. Distribution/Availability Statement. Denotes public availability or limitations. Cite any availability to the public. Enter additional limitations or special markings in all capitals (e.g. NOFORN, REL, ITAR).

DOD - See DoDD 5230.24, "Distribution Statements on Technical Documents."

DOE - See authorities.

NASA - See Handbook NHB 2200.2.

NTIS - Leave blank.

Block 12b. Distribution Code.

DOD - Leave blank.

DOE - Enter DOE distribution categories from the Standard Distribution for Unclassified Scientific and Technical Reports.

NASA - Leave blank.

NTIS - Leave blank.

Block 13. Abstract. Include a brief (Maximum 200 words) factual summary of the most significant information contained in the report.

Block 14. Subject Terms. Keywords or phrases identifying major subjects in the report.

Block 15. Number of Pages. Enter the total number of pages.

Block 16. Price Code. Enter appropriate price code (NTIS only).

Blocks 17. - 19. Security Classifications. Self-explanatory. Enter U.S. Security Classification in accordance with U.S. Security Regulations (i.e., UNCLASSIFIED). If form contains classified information, stamp classification on the top and bottom of the page.

Block 20. Limitation of Abstract. This block must be completed to assign a limitation to the abstract. Enter either UL (unlimited) or SAR (same as report). An entry in this block is necessary if the abstract is to be limited. If blank, the abstract is assumed to be unlimited.

THE BIRTH OF MODERN COUNTERFIRE:
THE BRITISH AND AMERICAN EXPERIENCE IN WORLD WAR I

A thesis presented to the Faculty of the U.S. Army
Command and General Staff College in partial
fulfillment of the requirements for the
degree

MASTER OF MILITARY ART AND SCIENCE

by

WILLIAM M. CAMPSEY, MAJ, USA
B.S., United States Military Academy,
West Point, New York, 1975

Accession For	
DTIC	DTIC
DTIC TAB	DTIC
Unannounced	DTIC
Justification	DTIC
Availability Codes	
Avail and/or	Special
Disc	Special
A-1	

Fort Leavenworth, Kansas
1991


Approved for public release; distribution is unlimited.

MASTER OF MILITARY ART AND SCIENCE


THESIS APPROVAL PAGE

Name of candidate: Major William M. Campsey
Title of thesis: The Birth of Modern Counterfire: The British
and American Experience in World War I

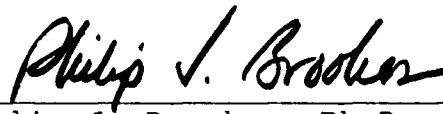
Approved by:

_____, Thesis Committee Chairman
Jerold E. Brown, Ph.D.

_____, Member
Major David P. Goebel, B.S.

_____, Member
Lieutenant Colonel John D. Skelton, M.P.A.

Accepted this 7th day of June 1991 by:

_____, Director, Graduate Degree
Philip J. Brookes, Ph.D. Programs

The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

THE BIRTH OF MODERN COUNTERFIRE: THE BRITISH AND AMERICAN EXPERIENCE IN WORLD WAR I by MAJ William M. Campsey, USA, 105 pages.

This study investigates the original needs for and development of counterfire techniques in World War I. Concentrating on the experiences of the British and the Americans, the examination explores techniques of counterfire and their failures or successes.

The first chapter investigates why World War I was the first war in which modern counterfire techniques were employed. Chapter 2 describes the British experience. Chapters 3 & 4 explain how the Americans trained for and fought in the war. The last chapter analyses those techniques and principles of action that had relevance for both nations.

The study concludes that several techniques were necessary in World War I to suppress enemy artillery. First, efforts to destroy enemy artillery before battles were not as successful as efforts to neutralize it for the duration of the battle. Second, with the enormity of details necessary to collect intelligence, assign targets, preposition ammunition, and execute the program of fire, competent staff work became critical. Third, the intelligence procedures developed in position warfare were insufficient to suppress enemy artillery as the battle line moved progressively forward. Suppression of all terrain in the zone of operations that was capable of holding enemy artillery became necessary. Finally, artillery organization and control must be centralized.

The study also identifies two techniques necessary to exploit successful counterfire. First, surprise over the enemy would invariably gain the initiative. The enemy guns would not recover from the surprise for the duration of time that neutralization fires continued. Second, counterfire must be integrated into the overall fireplan and the infantry scheme of maneuver. It did the commander no good if counterfire was successful only to fail to exploit that success with maneuver.

*To Grandpa,
my first war hero
(even if he is a sailor)*

ACKNOWLEDGMENTS

Many people assisted in the development of this effort. First, I must acknowledge the help of my committee, Dr. Jerold Brown, LTC John Skelton, and MAJ Dave Goebel. Their helpful, but firm guidance kept me on the right track throughout all of the months of this endeavor. My Academic Counselor and Evaluator, LTC Bob Ramsey, provided outstanding support in lending me some of his primary sources and keeping me encouraged. The archivist in the Combined Arms Research Library, Karla Norman, found many documents that assisted in my research. She also trusted me to check out some of their rare books and documents; allowing me to research even deeper some of the more obscure aspects of this thesis. Finally, my family gave over countless weekends during the "best year of my life." To them I owe not only my gratitude, but I had better make up some of those weekends.

CONTENTS

APPROVAL	ii
ABSTRACT	iii
ACKNOWLEDGMENTS	v
PREFACE	vii
Chapter	
1. ARTILLERY LEAVES THE LINE OF BATTLE	1
2. THE BRITISH EXPERIENCE	21
3. AMERICA PREPARES TO FIGHT	52
4. AMERICA FIGHTS	67
5. CONCLUSION	87
GLOSSARY	100
BIBLIOGRAPHY	101

PREFACE

This thesis is a history paper. However, my motivation for writing on the history of counterfire is grounded in my belief that present U.S. Army tactics, techniques, and procedures are inadequate. For at least the last 15 years, the U.S. Army Field Artillery has not had a complete doctrine for counterfire. Experiences at the combat training centers, most importantly in the BCTP exercises, have precipitated our understanding of the need to develop such a doctrine. Since, until very recently, we have had virtually nothing, a hasty attempt was made to put a doctrine in the field. The Field Artillery School published a White Paper on 1 November 1989. With minor revisions the techniques presented in that White Paper were incorporated into the latest FM 6-20-30, Fire Support for Corps and Division Operations, dated 18 October 1989. A comparison of the dates of these two documents indicates that the White Paper was published after the field manual had been sent to the printer. There was no opportunity for rebuttal from the field nor, from all indications, was there any attempt to start the development of the doctrine from a historical perspective.

The methods now published in the Field Manuals represent more than the official pronouncement of recommended procedures. In the longer term they represent

the start of the search for the best methods of counterfire. They are the opening salvo wherein the school challenges the field to contribute to the development of new doctrine. This thesis addresses that challenge in that it begins the process of defining our history. For while it is true that history is not so didactic as to present us with formulas for success for our future wars, it is also true that we cannot predict where warfare will take us without first understanding from where it has brought us. We who aspire to influence the writing of procedures for a future war must understand the experiences of our predecessors. Much has changed since the artillerymen of World War I and their commanders grappled with the problems of protecting the infantrymen's advance across No Man's Land. However, the basic endeavor to protect the commander's freedom of maneuver by protecting his infantrymen from the enemy's artillery remains as valid today as it was in World War I.

As a serving field artilleryman, I have resisted the temptation to comment in this document about the relevance of the lessons of World War I to today--I will succumb to that temptation in other media. As I mentioned at the start, this is a history paper. It tells the story of the British and American experiences with counterfire in World War I. I believe, however, that some of my colleagues will be surprised to discover that many of the lessons these old

soldiers learned are suspiciously similar to some of the
"new" ideas that have come into fashion of late. I hope
this document will be a positive contribution to the debate.

CHAPTER ONE

ARTILLERY LEAVES THE LINE OF BATTLE

World War I infantrymen on the Western Front shared a common existence. The British *tommy*, the German *soldat*, the French *poilu*, and the American *doughboy* lived in a muddy, wet, rat-infested trench that was bone-chilling cold and oppressively hot. In an active sector they were usually hungry, thirsty, exhausted, and sick. They lived with fear. It was a fear that peaked just before going "over the top." These men were attacking machinegun positions, and their assault included a journey across a distressingly open piece of ground called "No Man's Land." Advancing was a proposition requiring no small amount of courage.

There was an omnipresent fear of the dominant weapon on the battlefield, the artillery. Even in a "quiet sector," each soldier knew that an artillery or mortar shell could arrive without notice to deliver him from his wretched circumstances. But if he was curled tight in the bottom of a trench, hoping to survive a full fledged enemy barrage, the fear took on a special character.

When one heard the whistle in the distance, one's whole body contracted to resist the too excessively potent vibrations of the explosion, and at each repetition it was a new attack, a new fatigue, a new suffering. Under this regime, the most solid nerves cannot resist for long; the moment arrives where the blood mounts to the head;

where fever burns the body and where the nerves, exhausted, become incapable of reacting. Perhaps the best comparison is that of seasickness... finally one abandons one's self to it, one has no longer even the strength to cover oneself with one's pack as protection against splinters, and one scarcely still has left the strength to pray to God... To die from a bullet seems to be nothing; parts of our being remain intact; but to be dismembered, torn to pieces, reduced to pulp, this is a fear that flesh cannot support and which is fundamentally the great suffering of the bombardment¹

On the offense enemy artillery could do havoc on the advancing foot soldiers. Crossing "No Man's Land," the infantrymen had to deal with the inevitable machinegun positions *not* knocked out by the artillery preparation. He was also helpless to deal with the incoming enemy artillery fire:

Such thin enemy lines did not cause us excessive casualties. Because of the flat trajectories [of enemy machineguns], our infantry could find protection in the folds of the ground. But our attacks became immobilized, and it was impossible to advance. In this situation, it was a question of time before the German artillery, advised of the positions of our line, began to sweep it with severe concentrations. This was what caused our losses, and the failure of the attack. Unable to escape the artillery fire without exposure to devastating machine gun fire, our infantry had to endure severe punishment and

¹Paul Dubrulle, quoted in Alistair Horne, *The Price of Glory, Verdun 1916*, (London: Penguin Books, 1962), pp. 189, 190.

was unable to advance at all,² until again supported by artillery fire.

Artillery was inarguably the dominant force on the World War I battlefield. However, it was not decisive. The destructiveness caused by incoming rounds was matched by its randomness. Artillery, an area weapon, can guarantee tremendous slaughter in its general target area, but it cannot guarantee complete annihilation of a large enemy position. Consequently, the other technological terror of contemporary warfare, the machinegun, survived the bombardment in sufficient numbers to deny any attackers the privilege of their objectives.

Obvious requirements of combat grew out of the early experiences of World War I. The attacker must silence the enemy's artillery and his machineguns. Artillery had to be subdued in order to neutralize the greatest killer on the battlefield. Machineguns had to be overcome in order to obtain tactical decision. The efforts to subdue an enemy's artillery marked the birth of modern counterfire procedures (hereinafter referred to in contemporary terms as "counterbattery"). As with so many other aspects of this horrible conflict, this tactical dilemma was never fully

²Conrad H. Lanza, "The Artillery Support of the Infantry in the A.E.F.", *Field Artillery Journal* 26 (January-February 1936): 71.

resolved before Germany lost the war through sheer exhaustion. However, this newborn and evolving concept was a doctrine born of necessity in which each new procedure's success or failure was measured in terms of human blood and ground gained.

Pre War Dogma: The Spirit of the Offense

But it was not supposed to be like that. For thousands of years soldiers fought looking each other in the eye. Who ever heard of mathematicians and technicians dominating the battlefield? Was it not the sheer force of character and the imposition of one's will over the enemy that captured victory? Warrior psychology in France, Germany, and England could not conceive of the cold, calculating, and impersonal steel of indirect fire being of any critical consequence on their battlefield. Their dogma became the superiority and independence of the infantry. In France, especially, the doctrine became the *offense a outrance* ("Take the offense at all costs"). Although Germany showed more respect for modern firepower, the offense was doggedly pursued as well.

In France, the military elite were obsessed with recovering the honor lost with their ignominious defeat in

the 1870 Franco-Prussian war. Colonel Louis de Grandmaison, French director of military operations, exemplified the contemporary mania for the offense:

...it is more important to develop a conquering state of mind than to cavil about tactics ... In battle one must always be able to do things which would be quite impossible in cold blood. To take one example: to advance under fire ... Nothing is more difficult to conceive of in our state of mind now ... We have to train ourselves to do it and train others, cultivating with passion everything that bears the stamp of the offensive spirit. We must take it to excess: perhaps even that will not go far enough.³

Britain and Germany held similar notions. In Britain, General Sir Ian Hamilton wrote: "War is essentially the triumph, not of a chassepot over a needle-gun, not of a line of men entrenched behind wire entanglements and fire-swept zones over men exposing themselves in the open, but of one will over a weaker will ... the best defence to a country is an army formed, trained, inspired by the idea of attack."⁴

³ Louis de Grandmaison, quoted in Micheal Howard, "Men against Fire: The Doctrine of the Offensive in 1914", *Makers of Modern Strategy, from Machiavelli to the Nuclear Age*, ed. Peter Paret, (Princeton: Princeton University Press, 1986), p. 520.

⁴ Sir Ian Hamilton, quoted in, Howard, "Doctrine of the Offense", p. 521.

The German colonel, Wilhelm Balck, in his definitive work on tactics wrote: "The combat requires enterprising, self-sacrificing, cold-blooded men who are imbued with the spirit of the reckless offensive."⁵

This adherence to the offense assumed an almost religious fervor. De Grandmaison wrote in 1913, "The French Army, returning to its traditions, recognizes no law save that of the offensive."⁶ It is no great surprise that the military intelligentsia saw artillery as complimentary, but not essential, to the infantry. General Frederick Georges Herr, a distinguished French artilleryman, lamented the lack of appreciation for the role artillery should play on the battlefield.

Field Service Regulations [prior to the war] stated that field artillery fire had only small efficiency against a sheltered adversary and that it was necessary to attack with infantry in order to lead the adversary to uncover himself.

To draw from this, the conclusion that field artillery was only an accessory and a secondary arm, was but a step. Since [according to these Field Service Regulations] it had a low efficiency except against living targets in the open, it was useless to employ it to destroy sheltered or even masked targets, or material obstacles. The fight against enemy field artillery which would undoubtedly be masked, could not be decisive. It

⁵Wilhelm Balck, *Tactics*, vol. 1, *Introduction and Formal Tactics of Infantry*, trans. Walter Krueger, (Leavenworth, KS: Press of Ketcheson Printing Co.), p. 109.

⁶ De Grandmaison, in, Howard, "Doctrine of the Offense"

would therefore only be an episode of secondary importance in the battle.⁷

These prejudices developed over the history of warfare. They were overcome only after the slaughter of the early battles of the Great War.

Pre War Development of Artillery

The cannon that arrived on the World War I battlefield was a culmination of several separate, but parallel developments in science and technology. Gunners and scientists had for hundreds of years tried to solve the technical problems of gunnery, breech-loading, rifling, and recoil. One of the earliest scientists to explore technological improvement was the British scholar Benjamin Robins. He undertook a series of experiments in 1792 to explore the effects of rifling on the accuracy of a projectile:

...whatever state shall thoroughly comprehend the nature and advantages of rifled barrel pieces, and, having facilitated and compleated their construction, shall introduce into their armies their general use with a dexterity in the management of them; they will by this means acquire a superiority, which will almost equal any

⁷Frederick George Herr, "Field Artillery, Past, Present, and Future", *Field Artillery Journal* 17, (May-June 1927): 223

thing, that has been done at any time by the particular excellence of any one kind of arms...⁸

Although he was alluding only to rifling, his comments could have applied to any technological improvement in artillery that would have increased its range, accuracy, volume, or destructiveness.

The American Civil War saw the first significant use of rifled cannon on the battlefield. Its effects on combat were mixed. Attacking a well prepared defense, cannoneers found that increased accuracy did them little good when defenders placed themselves behind earthworks. Contemporary artillery projectiles could not penetrate these defenses, rendering ineffective the cannoneer's support to the infantry attack. On the other hand, artillery in the defense was deadly effective. Russell Weigley observes:

...although the artillery projectiles of the 1860s could not accomplish much against defenders protected by earthworks, they could do havoc among the unsheltered soldiers of an attacking infantry force. So destructive did rifled muskets and cannons prove themselves to be against attacking infantry in the American Civil War that attackers could win battlefield decisions if at all only through immense sacrifices of their own manpower.⁹

⁸Benjamin Robins, quoted in, Frank E. Comparato. *Age of Great Guns*, (Harrisburg, Pa: The Stackpole Company, 1965), p. 16.

⁹Russell F. Weigley, *The American Way of War*, (Bloomington: Indiana University Press, 1973), p. 91.

Rifled muskets were equally effective against any artilleryman foolish enough to believe he and his cumbersome piece could survive on the front line of battle, where he had always been placed. For the first time in history, accurate infantry fire could match, and exceed, the range of artillery. Considering the relative rates of fire, the artilleryman would invariably lose the duel. The cannoneer's greatest vulnerability was the requirement to move to the front of the weapon to load the powder and the projectile. Muzzle loading was awkward and dangerous. In the excitement of battle, cannoneers could easily forget that they had already loaded a piece. If they were to double load the cannon, the resulting explosion would kill or maim most of the crew. Thus arose the tactical impetus for breech loading artillery.

The idea of breech loading had been around as early as the fourteenth century. However, the tremendous pressure inside a cannon chamber prevented realization of this concept until the late nineteenth century. The industrial revolution provided not only the necessary technology, it provided the requisite sociological impetus to develop such complicated machinery. In his history of artillery, *Age of Great Guns*, Frank Comparato observes: "...where cannon founders were content to cast guns conventionally in one

piece, industrialists (and inventors) would want to machine them and give them cleverly working parts."¹⁰

And so they did. Although efforts to perfect the breech loader were ongoing in several countries, Germany's Krupp's industries enjoyed the greatest success. By the time of the Franco-Prussian War this technology was ready for the battlefield.

Although over 200 heavy Krupp pieces would fail because of breech defects (and lead-sheathed shells with poor fuses often only "splashed" on impact), German artillery was murderous. One entire French battery was wiped out by fire at 4000 yards; at Sedan (September 1870) three horse batteries, each strategically positioned by the Emperor himself, were spotted and destroyed before they could fire a shot.¹¹

As with so many other aspects of the Franco-Prussian war, this inglorious defeat served as impetus, such as nothing else could have, to spur the French to obtain technological and tactical excellence. They were to develop the artillery piece that artillerymen for centuries had awaited. The French *soixante-quinze* (seventy-five) had a rifled barrel and a reliable breech. More importantly, however, the French solved the problem of recoil.

¹⁰ *Great Guns*, p. 22.

¹¹ *Great Guns*, p.28.

Heretofore, the massive power generated by the escaping projectile forced the artillery piece out of battery (i.e., out of its original position). To solve the problem of recoil was to resolve two vexing difficulties: speed of reloading and corrections to the error of the first round on a target. Cannoneers firing a piece equipped with a controlled recoil did not need to roll the piece back into battery. They merely laid the weapon on the required azimuth and elevation, loaded the prescribed charge and projectile, and fired the weapon (standing clear of the tube's recoil, but otherwise in close proximity to the weapon). At the end of this process the cannon was ready to begin the same process *without any other preparation*. This greatly increased the rate of fire.

But by far the greatest advantage of a controlled recoil was that the gun was returned "to battery." Adjustments to errors could not be reliably made without the gun returning exactly to its original firing position. Comparato describes the problem: "it gave the gunner no advantage if he almost hit his target on the first round--the second had to be newly sighted all over again. There was no such thing as improving or refining the aim, except

for what a cannoneer was able to remember of his previous sight picture."¹²

The French seventy-five was the culmination of centuries of scientific and technological exploration. For the first time gunners had a weapon which solved the problem of breech loading, rifling, and recoil. The synergistic effect of these elements was to make the science of gunnery relevant. Scientists had for centuries been interested in interior and exterior ballistics, the essence of gunnery.

Again, Comparato:

The interest of early scientists and mathematicians in the motion of bodies, both heavenly and terrestrial, led them to incorporate firearms in their first experiments. For artillery it was fortuitous choice. Considering the mysteries of gunpowder, the elusive strengths of barrels, and the complex effects of air and gravity, it is easy to see why the scholar was often tempted to abandon, at least temporarily, his theoretical research in order to solve, for his friend, the gunner, the problems of ballistics.¹³

Now, at last, the scientist and the gunner could combine wits to solve the problem of gunnery. Application of the theory of ballistics to the practice of gunnery was evolutionary. As early as 1890, cannoneers developed

¹²*Great Guns*, p.32.

¹³*Ibid.*, p.71.

rudimentary procedures to increase the accuracy of "curved" fire. The discussion on improved techniques continued for the next twenty years. At the outbreak of war, the principles on the theory and application of gunnery were well understood by all professional artillerymen. The exigencies of combat and the requirements of training nonprofessionals forced each side into formalizing these principles into understandable and practical techniques.

Technology had forever driven artillery from the front lines. Accordingly, the dominant force on the battlefield became invisible. Unless they could begin to understand and control the terrible effects of this invisible tyrant, the soldiers on the front lines became subservient to the "mathematicians" and "technicians" who caused this new slaughter.

Early War Artillery

Although each of the three major belligerents on the western front believed in the value of the offensive, France, Germany, and Britain developed divergent artillery doctrines. France was so enamored with the capabilities of the seventy-five that its limitations were overlooked and, at times, even rationalized. Germany had more respect for modern firepower, and sought to perfect its heavy howitzers.

Britain built a mix of artillery similar to Germany's, but did so without a coherent doctrine.

France's almost religious adherence to the capabilities of the seventy-five was not without its opponents. General Herr, commander of the artillery of the 6th Army, visited the Balkans, and interviewed Turkish and Serbian artillery officers. He wrote that he "was absolutely convinced by this investigation that *long-range heavy artillery* was indispensable in modern battle and that it should work in constant liaison with the light artillery[Emphasis in original]."¹⁴ His report, published in 1913, caused considerable controversy. In the end the adherents to the seventy-five won with the argument, "a maneuvering artillery which knows how to use the terrain will be able to get within suitable distance of the enemy and will only rarely need a long-range gun."¹⁵ However, Herr indicated that the experiments and debates on heavy artillery had been worthwhile to develop prototypes available for production if the exigencies of combat proved them necessary.

¹⁴Herr, p.237.

¹⁵A note by the General Staff of the Army of January, 1914, quoted by Herr, p. 237.

The Germans' greater respect for firepower led them to develop heavier and longer range artillery.¹⁶

Wilhelm Balck explained the German use of the heavy artillery:

Heavy artillery may be used even at very long ranges against targets that prove too much for field artillery or that are most dangerous to the infantry. The fire of heavy artillery has a decisive effect upon shielded artillery when visible, upon infantry in trenches or behind parapets, and particularly upon fortified supporting points. But the first and foremost duty of heavy artillery consists of relieving its field artillery, in order that the latter may devote itself to supporting infantry.¹⁷

France's General Herr confirms the German doctrine in his post war writing:

The long range of the powerful materiels will be used, from the first moment of contact, to prevent the assembling of enemy troops, against columns on the march, and such batteries as can be located.

Protected permanently by the fire of the heavy artillery which will clear away a great part of the hostile artillery, the light artillery will freely and efficaciously devote itself to its main

¹⁶Whether Germany's reliance on big guns was due to farsightedness of German soldiers or due to the influence of the Krupp manufacturing family is subject to debate. For the purposes of this thesis, however, it is important to understand only that German doctrine supported the major amounts of heavy artillery in their inventory. See, Comparato, p. 26.

¹⁷Wilhelm Balck, *Tactics*, vol. 2, *Calvary, Field and Heavy Artillery in Field Warfare*, trans. Walter Krueger, (Ft. Leavenworth, Kansas: U.S. Calvary Association, 1914; repr., Westport, Connecticut: Greenwood Press, 1977), p. 293.

mission, the direct and immediate support of the infantry.¹⁸

Whereas the French doctrine relied on the rapid fire of the light gun to suppress the enemy while the infantry gained moral superiority, the German doctrine called for a mix of heavy and light artillery to pave the way for the infantry. The Germans believed that an infantry attack could not be successful without artillery support. The French believed that while artillery was useful, it was not essential. As General Herr lamented:

It is apparent that this theory [German artillery doctrine] was, in several respects, directly opposite to ours which declared a previous artillery duel fruitless, which did not believe in the necessity of preparing for the attacks and which, finally, little convinced of the usefulness and even of the possibility of having the heavy artillery cooperate in all phases of battle in open warfare, relegated it to the rear of the columns and reserved it for special missions.¹⁹

To understand British military thinking one must understand that the British *had no artillery doctrine* at the outset of the war. This was due to many factors, but most importantly to the homage to pragmatism and the distrust of theory.

¹⁸Herr, pp. 229, 230.

¹⁹*Ibid.*

No doubt the rising staff officers who were rebuilding the Army in the decade before 1914 hoped to inspire a balance between the German reverence for theory based on historical analysis and British empiricism. But it was an uphill struggle, for anti-intellectualism was the ruling mode of thought. ... The very existence of conflicting French and German answers to every tactical question was a distraction in the face of which they wavered. Lacking a sound doctrine of their own either they hesitated to accept ideas from foreigners or adopted them piecemeal without understanding the purport of doing so.²⁰

Standard British artillery employment was a haphazard evolution of the acceptance or rejection of various continental ideas. There was no influential thinker to guide the development of doctrine.

Early Battles

The initiation of combat on the western front validated German thinking on artillery doctrine. From the surprise introduction of the 420 mm mortar in Belgium to the final stabilization along the western front, the side with superior heavy artillery would overcome its opponent.

The French seventy-five lived up to every physical characteristic expected of it. Despite its efficacy, it could not totally compensate for the failure of the French philosophy. Whereas adherents to the seventy-five believed

²⁰ Bidwell and Graham, p. 19.

it could maneuver within its own range of enemy heavy artillery, events proved differently. German heavy artillery sought the seventy-five, usually found it through a combination of spies and poor French camouflage, and set about destroying or neutralizing it. Because of their almost religious adherence to the virtues of the seventy-five, the French had no weapon system immediately available capable of responding to this out-of-range adversary.

The German heavy artillery was mobile. However, it was not as fast as the battle line in open warfare. General Herr describes what would happen when the front line became out of range of the heavy artillery:

Our 75-mm gun now regained its advantage and being free to apply its deadly qualities against unprotected targets at short range, at times veritably massacred the German infantry. Our difficulties began again as soon as the German heavy artillery caught up with their infantry. We were forced to withdraw, retreating before the "big blacks" to whom we could not reply.²¹

Desperate measures were necessary. The French were compelled to find some solution to their critical shortage of heavy artillery. Again, General Herr,

To meet the most urgent needs, it seemed wise to use everything available. Early in September, the Commander-in-Chief authorized several armies to borrow from the ammunition supplies of the

²¹Herr, p. 241.

eastern fortresses [in the Lorraine area]; a few days later, he asked the Minister of War for authority to take, first, guns, and secondly, personnel, from the heavy artillery of the fortresses ... and even to use the Coast Artillery. ... In this way we could improvise the heavy artillery which we lacked, in order to hold our own against the powerful guns of large caliber with which our adversaries were provided.²²

The artillery borrowed from the eastern fortresses had been designed to stay in one place. Therefore, substantial preparation was required to move and emplace these cumbersome old pieces. Fortunately, the front was stabilizing. The lack of mobility inherent in these old pieces did not become a critical deficiency. They allowed the French time to build new heavy artillery from the prototypes that General Herr had praised before.

The early battles on the western front illustrated what would not work. Light artillery, not complimented by heavy artillery, was not effective when outranged. A combatant needed the capability to respond when attacked. Without the proper range to do so, the French were unable to remain in position, and forced to retire. It became obvious that the invisible artillery force on the battlefield must be neutralized.

Necessity of Counterbattery.--The harassing and demoralizing action of the German artillery made clear, from the beginning, the advantage which

²² *Ibid*, p. 244.

would be obtained by silencing it with counterbattery fire.

It was understood that if the artillery duel should not destroy the hostile artillery, it could at least neutralize it and stop its firing. ... we learned, to our cost, the correctness of the German opinion as to the special fitness of heavy artillery for counter battery.²³

The heavy artillery could begin production almost immediately. However, effective procedures for counterbattery were to slowly evolve in all armies over the next four years. Artillery would remain dominant, but not decisive until then. In the meantime, the French infantry would continue to pay the price in countless lives.

²³ *Ibid*, p. 243.

CHAPTER TWO

THE BRITISH EXPERIENCE

While France and Germany had nationwide conscription, detailed war plans, and detailed mobilization plans for total war on the continent, Britain maintained an army that was small and equipped and trained to fight colonial wars. All nations were caught reacting to the intensity of total wars between industrialized nations. But Britain had to find ways to deal with that intensity while she furiously strove to build an army of numbers. In this environment, British gunners improvised to compensate for shortages in men and materiel as they experimented with new tactics to succeed in modern war.

The British Expeditionary Force (B.E.F.) entered the Great War with a severe shortage of medium and heavy artillery. For the entire force there were only eighty-nine heavy and medium pieces. This included twenty-four old siege guns for which a cumbersome platform must be emplaced at each gun position.²⁴ This was far short of the numbers

²⁴Great Britain, *Military Operations, France and Belgium, 1914, History of the Great War*, comp. J.E. Edmonds, vol. 2, (London: MacMillan and Co., Limited, 1925), 164.

necessary to meet the challenge Germany presented. Consequently, for the first few months (and to some degree for the first two years) British artillerymen had to gamble in order to concentrate artillery for an attack.

A far greater challenge than the lack of guns was the lack of ammunition. Even for the paltry number of guns in the British sector of the Western Front, British industry could not keep pace with their demand for ammunition. The situation became so critical at one point in the first battle of Ypres, that General Douglas Haig, then the I Corps commander, "withdrew from each of his divisions three field batteries and one howitzer battery--that is, one-third of the field artillery--and sent them southwest of Ypres, so that the guns and gunners should not be exposed to fire to which they were unable to reply."²⁵ This shortage was the result of multiple causes, including conscription into the army of some of the more technically trained factory workers, and labor strikes at munitions industries. The dearth of munitions continued until well into 1916. This affected the planning, execution, and success or failure of Britain's battles throughout 1914 and 1915. The effect was felt in 1916, but not as dramatically. Given that counterbattery work became the exclusive employ of heavy

²⁵ *Ibid*, 379.

artillery using massive amounts of ammunition, these two factors (the lack of heavy guns and the lack of ammunition) were central to the development of counterbattery procedures in World War I.

Prior to World War I, British doctrine for counterbattery procedures was summed up in one sentence, "...locate the enemy's batteries and, by subduing the fire of those in action, to support the infantry."²⁶ Such a curt treatment of such a complex topic leads to two suppositions: first, British doctrine assumed that hostile batteries would be easy to locate, indeed, they should be even within the sight of the gunners; second, the result of this "artillery duel" was deemed to be of minor significance to the infantry. While British infantrymen certainly saw the value of their artillery brethren attaining domination over the enemy's artillery, they did not see it as critical to the result of the final battle.

Faced then with the true exigencies of combat, the doctrine remained valid only in its objective, that is, to "...locate the enemy's batteries, and ... subduing the fire of those in action." All procedures had to be conceived,

²⁶British "Field Artillery Tactics" as quoted by A.F. Brooke "The Evolution of Artillery in the Great War", *Journal of Royal Artillery* 51, no. 5 (1925): 261.

tested, refined or rejected, and tested again in the laboratory of the battlefield. The mere fact that artillery could participate in battle without being seen destroyed the paradigm of battle as held by virtually all senior commanders. First, duration of battle was no longer defined by the amount of time that hostile infantrymen held each other in view. One could now continue to attack his opponent as long as he was in range and as long as he could be seen or suspected in a particular location. Second, even in the best of circumstances, a commander could no longer expect to see all of the enemy's immediately available combat power. Indeed, the most destructive combat power, the artillery, was deliberately divorced from the field of vision of the opponent. It was with a discredited pre-war doctrine that gunners and their commanders attempted to forge valid procedures to subjugate the enemy's artillery.

The first hint of trench warfare was manifest in the first battle of Ypres waged in late October and early November 1914. Until this point, each belligerent had waged open warfare. Execution of the Schlieffen plan called for a giant wheel sweeping through Belgium and the north of France. It was only close to Paris that the French finally stopped the Germans at the first battle of the Marne. Throughout the rest of the year, the belligerents continued to attempt flanking maneuvers on each other, thereby

extending the battle line further towards the west, and to the west lay the sea. This "race to the sea" culminated with the first battle of Ypres.

Ideas of survival and "making something work" became the desperate order of the day. It was during the first Ypres that British contingency stocks of artillery ammunition began to run low. Interestingly enough, the Royal Navy was called upon for assistance. Two navy 4.7" guns and one navy 6" gun were entrained and moved to the front. The inattention that befell army munitions prior to the war did not extend to navy munitions. Therefore, the British commanders at first Ypres had three medium to heavy pieces with plenty of ammunition. The officer primarily responsible for counterbattery matters was a navy officer, Lieutenant Commander Littlejohns.²⁷ These three guns, although useful, were not sufficient--thousands of pieces would eventually be made available during the war. The British Official History describes the beating the British infantry was taking on 5 November 1914:

The centre of the British front, held by Cavan's detachment and the 7th and 1st Divisions, suffered very severely on the 5th owing to the increased number of guns and the extra ammunition which the enemy brought up. On the other hand, although General Haig had sent off the field a third of his field artillery, he was compelled to issue instructions limiting the issue of

²⁷ *Military Operations in France and Belgium, 1914*, 164.

ammunition from railhead to 20 rounds per 18-pdr. and 10 rounds per 4.5-inch howitzer. Several of Lord Cavan's battalions had to be withdrawn from the trenches to shelter in the woods; and the 1st and 7th Divisions suffered more than the normal casualties from shell fire.²⁸

The British failed to silence the German artillery at first Ypres and suffered heavily for it.

The scourge of insufficient artillery materiel and munitions continued to afflict the British at the battle of Neuve Chapelle in March 1915. However, austerity fertilized imagination. Out of necessity, Haig employed methods that were to become principles of artillery employment much later in the war. He developed: a short, but intense bombardment to suppress the enemy without giving him time to call for reserves, and neutralization of the enemy's artillery throughout the time the infantry needed protection. Heretofore, much effort had been given over to attempts to destroy the enemy's batteries before the battle began. The amount of ammunition required for that operation coupled with the infancy of contemporary gunnery procedures made preemptive destruction of enemy artillery extraordinarily difficult if not impossible. But to neutralize the enemy gunners for a specific period of time was practical, if one could locate all of the enemy's batteries.

²⁸ *Ibid*, 383.

Haig, now the commander of 1st Army, borrowed enough artillery pieces to concentrate on his zone of attack. He had laid out a very comprehensive fire plan, which *integrated* the counterbattery plan. This early in the war, battery positions were not well camouflaged. Over the course of time, British pilots found most of the German artillery. The British attacked it in consonance with the infantry's assault on the trenches. Throughout the remainder of the day, there is no mention of British casualties inflicted by German artillery.²⁹ That is the ultimate success of counterbattery. The following day, with German reinforcing artillery taking new positions undetected by the British, German artillery again inflicted great casualties against the attacking infantrymen.

The small successes attained in this battle were misinterpreted. Use of artillery in later battles illustrates that the British saw the short bombardment and the neutralization of the enemy's artillery as necessary only due to their austere materiel. Without the hindsight that history provides, their hypotheses are not unreasonable. Would not more artillery, delivered to the enemy over several days, dig the enemy out of his holes and

²⁹Great Britain, *Military Operations, France and Belgium, 1915, History of the Great War*, comp. J.E. Edmonds, vol. 1, (London: MacMillan and Co., Ltd, 1927), 93-116.

make the infantry assault a "mopping up" operation? Likewise, is it not better to destroy enemy batteries and remove their influence from the battlefield rather than merely suppress them for the duration of time that the infantry was exposed? These rational but wrong ideas obscured the actual lessons learned at Neuve Chapelle. The British learned the wrong lessons.

In the course of the next two major battles, Festubert (May 1915) and Loos (September 1915), the ammunition shortages were still serious, but not critical. This relative affluence encouraged the commanders to try a longer, more methodical bombardment. This long bombardment included an attempt to destroy the German artillery batteries. In both of these battles, the enemy artillery was silent throughout the course of the bombardment. However, when the actual infantry assaults began, they were met by German artillery which still dominated the battlefield. This would seem to illuminate and confirm the actual lessons of Neuve Chapelle. Once again, it is the hindsight of history, not the preponderance of contemporary evidence, that allows today's student to see this so clearly. That neither the long bombardment, nor the attempts to destroy the enemy's artillery were successful could still be reasonably attributed to the lack of sufficient ammunition. It was to take one more battle, the

Somme, before the British would start to understand these lessons.

By 1916 British industry had eased the dearth of ammunition and artillery pieces. To be sure, the vast quantities that were to be used later in the war were not yet available. But the crises of 1914 and 1915 were past and Haig felt he had sufficient artillery and ammunition available to take the offensive. A vast preparation ensued. The British gathered ammunition and artillery necessary to fire a six day preparation. In fact, the bombardment was extended to eight days to accommodate a two day delay in initiation of the attack. So the six day supply of ammunition had to be stretched over eight days thereby weakening the intensity of the bombardment over the last four days.

The goal of the counterbattery effort during this long barrage was to destroy all known enemy artillery positions. During the actual assault, siege and heavy artillery was to continue to attack the enemy artillery. The lack of sufficient ammunition would not allow both efforts to succeed. Artillery gunnery, in its infancy, was largely inaccurate. Therefore, a tremendous amount of ammunition was necessary to destroy just one battery. In spite of seven days of effort the Royal Flying Corps (R.F.C.)

reported 171 enemy batteries in action on 30 June 1916, the day before the assault.³⁰ Even with this report, the British were prone to optimism in the hours just before the attack, "The quiescence of the enemy batteries... confirmed the hope that the seven days' bombardment had done its work."³¹ Just a few hours later, that hope was shattered. The officers ordered their men "over the top," and "Almost simultaneously the German gunners ceased...[other] work and concentrated their fire upon the assault."³²

With but one exception, German artillery slaughtered British infantry all along the Fourth Army front. That one exception was the XIII Corps whose assault was immediately adjacent to the French XX Corps of the French Sixth Army. British *Official History* attributes the success of the British and the French in this area to a sufficiency of artillery and ammunition that did not exist across the rest of the First Army front:

The corps [XIII Corps] heavy artillery, which, combined with that of the French XX. Corps on the right, was greatly superior in numbers to the German in this sector, being nearly four to one, had already obtained the mastery of the enemy, and during the 1st July it practically

³⁰ Great Britain, *Military Operations, France and Belgium, 1916, History of the Great War*, comp. J.E. Edmonds, vol. 1, (London: MacMillan and Co., Limited, 1932), 306.

³¹ *Ibid.*, 314.

³² *Ibid.*, 315.

destroyed its opponents, so that there was almost a complete absence of artillery reply. Indeed, so well had it done its work that, as will be seen, there was little resistance except from a few of the strongpoints, and machine guns, not artillery, were responsible for the British casualties.³³

The Official Historian suggests here that the preponderance of artillery alone was the sole reason for the successful counterbattery work.

Indeed, a preponderance of artillery was necessary to overwhelm the enemy. But the concept of employment of this advantage of numbers is just as critical to success. Marshal M. E. Fayolle, commander of the Sixth Army, was fully aware of the critical importance of counterbattery work to the success of the assault. In his contribution to *La Guerre Racontee par nos Generaux*, he devotes a considerable amount of effort to explaining the importance of counterbattery work and the difficulty of that task imposed by the new technology of indirect fire.

Therefore it was necessary to control them [enemy batteries], destroy them, or more or less reduce them to silence. To do less was to watch our assaults crushed by the enemy's fire.

In summary, the multiple roles of the artillery follow:

³³ *Ibid.*, 324, 325.

Third, an incessant struggle against the enemy's artillery.³⁴

Even given the superiority of numbers of his artillery, Fayolle apparently understood that regardless of the numbers of enemy batteries destroyed, the measure of success of counterbattery work is finally determined by how well the friendly commander's freedom of action is preserved. What that meant on the first day of the Somme was the number of infantrymen that lived through the initial assault to continue the attack. Fayolle's judicious use of superior numbers allowed for the success of his own forces as well as the British forces to his immediate left. The British apparently did not understand this simple fact.

Why were the assaults of the infantry of the rest of the Fourth Army so effectively crushed by enemy fire? One of the primary reasons given by the *Official History* is the lack of artillery and ammunition.

The British High Command had relied on the bombardment destroying the enemy's material defences and the morale of his troops. ...the troops [were] trained in the sure and certain hope that the infantry would only have to walk over No Man's Land and take possession. ... But the expenditure of 1,627,824 shells in the seven days preceding the assault did not accomplish what had been confidently anticipated. ... The number of guns and howitzers was, in particular, inadequate

³⁴M. E. Fayolle, *La Guerre Racontée par nos Generaux*, vol. 2, "De la Somme au Rhin", (Paris: Librairie Schwarz, 1921), 175, 177.

to cope with so deep and wide an objective presenting so many targets... There was an entire lack of gas shell...except for the almost negligible quantity fired by the 75-mm. field batteries lent by our Allies.³⁵

But as the operations at Neuve Chapelle indicated, and as subsequent operations were to show, the one million plus rounds of ammunition used in the preliminary bombardment were ineffectively used. The British did not have the ammunition necessary to chase after the illusive goal of destroying the German batteries prior to the assault and neutralize the remaining batteries after the assault had begun. Had they concentrated the ammunition on neutralization, at least the first day of battle might have been different.

The battles of Arras finally found the British army with sufficient ammunition and artillery pieces to carry on their long attempts to destroy enemy batteries and to have munitions available for neutralization during the assault.

There had been many a bitter disappointment in previous offensives. This time, however, the artillery support was far more powerful, by reason not only of the increased number of pieces, especially heavy pieces, and improved technical methods, but also of the more abundant supply of ammunition and the superiority of its quality. The power of the bombardment had deeply impressed the troops who watched it. With knowledge of what

³⁵ *Military Operations in France and Belgium, 1916*, vol.1, 485, 486.

was required and experience, staff work, too, had greatly improved.³⁶

With this wealth of ammunition, the British generals finally had what they determined to be the necessary resources to methodically bombard the German positions and pave the way for the infantry assaults. They fully intended to destroy as much of the enemy artillery as possible before the initial assaults.

The policy during the 10 days previous to "zero" day will be as follows:

The work of destruction will be carried on with the greatest vigour, the ruling principle being that isolated active batteries will be dealt with first and those collected into groups or nest will be reserved for destruction to the last. It is easier to neutralize such groups, both with H.E. and Gas Shell, than isolated batteries. It must be clearly understood, however, that any particularly active and offensive hostile battery must be destroyed as soon as possible whether in a group or not, and also that the destruction of groups must not be postponed if no other work is waiting to be done.³⁷

Unlike procedures at the Somme, in attempting to destroy the enemy's artillery prior to the assault, the British did not deplete their ammunition supply to the point

³⁶Great Britain, *Military Operations, France Belgium, 1917, History of the Great War*, comp. Cyril Falls, vol. 1, (London: MacMillan and Co., Limited, 1940), 198.

³⁷"First Army Artillery Plan for the Capture of Vimy Ridge, 8th February 1917" as reproduced in Great Britain, *Military Operations, France Belgium, 1917, History of the Great War*, comp. Cyril Falls, vol. 1, Appendices, "Appendix 15", (London: MacMillan and Co., Limited, 1940), 52.

that it affected neutralization of the German artillery during the assault. Indeed, this neutralization was a vital component of the concept of the counterbattery plan as outlined in the First Army Artillery Plan:

At the opening of the Infantry attack the policy of destruction must give way to one of neutralization.

When once the neutralizing fire opens... every hostile position known to be occupied will be brought under the intense fire as far as this is possible with the means at our disposal.

As far as possible this neutralizing fire will be controlled by air and ground observers: the former must be fully conversant with the plan arranged for this work.

Special attention must be paid to the selection of batteries for neutralizing with gas shells: those nests of batteries not completely destroyed will be specially marked down for treatment in this way.

The efficacy of the gas shells will depend on a proper appreciation of the atmospheric conditions, especially of the wind; at the opening of a bombardment with gas shell fire must be intense and concentrated: after a thick cloud of gas has been formed the rate of fire should be reduced and H.E. shell interspersed. Occasional return to heavy concentrated bursts of gas shells will tend to keep low the efficiency of the hostile batteries concerned.

The effect of this method of neutralization must be closely watched, so that if it has met with marked success it may be applied to other nests of batteries, after one has been silenced.³⁸

These detailed instructions for neutralization (only partially quoted above) demonstrate an appreciation that by

³⁸ *Ibid.*, 53, 54.

whatever means were necessary, the enemy artillery must be silenced in order that the infantry advance proceed.

This artillery plan also demonstrates the significant increase in the quality of staff work surrounding counterbattery procedures. The number of artillery pieces and the quantity of ammunition had steadily increased since the beginning of the war. Simultaneously, the German artillery had learned increasingly effective techniques of camouflage. Responding to these techniques, the British developed more technical means to find their enemy. The general staffs had a massive amount of details to collect, collate, and analyze to find their foe. Likewise, the issuance of orders required them to organize the artillery for the operation, position the batteries throughout the sector, issue the ammunition, develop detailed programs of fire to attack the detailed lists of targets, develop flight plans for the airplanes assigned to the sector, and establish coordinating instructions to govern the relations between pilots and their assigned batteries. The staff procedures developed by the British to this point in the war are impressive, especially when one considers that before the Great War, artillery batteries were positioned on the front lines by the force commander, and they attacked their enemy through visual aim.

The battles of Arras illustrate that the British had finally begun to realize that they could silence the enemy's artillery by methods other than attacking the batteries themselves. This was a recognition that the enemy's fire support system was vulnerable to attack at several points including the communications systems and the observation posts (OPs). German artillery would be temporarily silenced by attacking such aspects of his fire support system. Timing with the initial assault was therefore critical to success.

A very effective method of neutralizing the hostile artillery is to destroy their telephone exchanges: these should be marked down and destroyed by very short concentrated bombardments at the latest possible moment before the attack is launched.

Similarly the destruction of O.Ps. should be reserved to the latest possible moment, arrangements being made for blinding those groups of O.Ps. with smoke clouds from 18-pr. and other shell which cannot be destroyed in a short bombardment.³⁹

The improvements in planning and preparation paid off. At 5:30 a.m. on 9 April 1917 a firestorm of artillery rained on the German lines. The rolling barrage was intensive. As it rolled forward, machineguns in enfilade opened fire placing their volleys just ahead of the advancing

³⁹ *Ibid.*, 53.

infantrymen. Within this closely orchestrated violence, counterbattery played a critical role:

Simultaneously, all the German battery positions and ammunition dumps were bombarded with high explosive and gas shell... The counter-battery fire was extremely accurate and well distributed... many of the horses of the German gun-teams and ammunition columns were affected by the gas, so that the batteries could neither change their positions nor get up ammunition. Most of the observation posts having been destroyed and the telephone cables cut, the batteries were also blind to events in the foremost defences. In consequence, there was only a very feeble response to the rocket signals from the front line. [Rocket signals were a back-up communication to wire, since wire was usually cut soon into every battle.]⁴⁰

For the first time since Neuve Chapelle, just over two years earlier, British infantrymen were protected from German artillery fire by unassisted British artillery. Although they were still vainly attempting to destroy batteries before the battle, the British had learned that the success of counterbattery was not measured by how much enemy artillery materiel was destroyed nor how many enemy artillerymen were killed. Rather, successful counterbattery supporting the offense amounted to protecting advancing infantrymen.

As so often happened in World War I, the British solved one problem only to discover that they had uncovered

⁴⁰ *Ibid.*, 319, 320.

another. Now that they had found the key to protecting the infantry as they advanced in position warfare, how would they support and protect the infantry as they advanced further away? Three problems were immediate. First, after years of position warfare, and especially after an intense and prolonged bombardment, No Man's Land had become a virtual quagmire. And the former No Man's Land became the place artillery had to position itself in order to support the advancing infantry. However, there were no suitable positions in this area without extensive engineer support. Second, although siege and heavy artillery had undergone extensive modernization since 1914, it was still large and clumsy and difficult to move across the battlefield. Here again, extensive engineer support was necessary to provide trafficable lanes in and through No Man's Land to get the heavy guns into position. These lanes had to be constantly maintained in order to sustain the bulky ammunition requirements of these behemoths.

Finally, the attack to neutralize enemy artillery in position warfare could be executed according to a prearranged time table against a series of targets that one had had weeks, sometimes months, to gather information on. But in open warfare, the enemy artillery (both that seeking to escape and that newly arriving to reinforce the threatened sector) took up new positions. The attacking

force could use aircraft to help find and attack the newly positioned batteries. However, this was insufficient. While in position warfare, the pilots had been able to study aerial photographs from previous days in order to go directly to and seek out adeptly camouflaged enemy batteries. In open warfare, the pilots had no such advantage, and often found the offending batteries only after they had been firing for a while.

The First Army staff had anticipated the first two of these problems in open warfare. The Artillery Plan included guidance to that effect:

Support of Infantry in later stages

The arrangement for the forward move of Field and Siege Artillery requires most careful organization. The new positions must be selected, and where possible, prepared, and ammunition placed ready in them.

The necessity for bridging trenches where required must be foreseen: and the work completed before the preliminary bombardment, where possible[Emphasis in original].⁴¹

This is, indeed, incomplete guidance. However, that the staff even anticipated that there would be a problem is remarkable given the paucity of open warfare experience any of them had. It was, in fact, an indication that staffs were discarding the trappings of military romanticism (e.g. *offense a outrance*) for the practical business of winning battles.

⁴¹ Appendices, 57.

The First Army found problems with many of its tactics in open warfare. Counterbattery procedures were no exception. Moving the artillery forward had inherent the pitfalls that the staffs had anticipated:

...nothing in the nature of a pursuit, nor any operation of consequence, could be contemplated until artillery and ammunition could cross the shell-torn battlefield. The original main roads were the only practicable routes, and these had been partially destroyed by months of bombardment; in some places mines had been blown below them, leaving great water-filled craters. Where the metallised surface still existed a deep covering of mud narrowed the roadway and prevented drainage, so that long stretches were indistinguishable from the ground on either side. The open country itself was impassable. The remains of wire entanglements, the shell craters and broken-in trenches prevented any movement except on foot, and even pack-mules, which took forward most of the supplies for the front-line battalions, had to use the roadways. Although over five thousand men had at once been set to work on the reconstruction and repair of these vital road communications, some days would be needed to make them passable for heavy traffic.⁴²

Although the early success had been heady, the very nature of the battlefield forced the First Army to pause on 14 April in order to repair lines of communication. The infantry, of course, could proceed, but hard experience had taught them to pause and wait for the protective cover of their artillery. This battle, as so many before it settled back to the position warfare that had become as unwelcome as it had become familiar.

⁴²*Military Operations, 1917*, vol. 1., 349.

The next battle of significance was the capture of the Messines ridge. The ridge held a magnificent view of the British battle lines. The Germans, having held it for two years, consistently made life nearly intolerable for the British. The objective was a tactical one: its capture sought to provide relief to the besieged British trenches and to anchor the right of the upcoming Passchendaele campaign. The same thorough and competent staff work governed counterbattery efforts in this battle as had been the case in the Arras campaign earlier. A massive collection of artillery and ammunition was gathered and the German artillery was methodically destroyed over a long period of time. This destruction campaign was more effective than any previous attempt. Leon Wolff describes the efficacy of the counterbattery work in his book, *In Flanders Fields*:

...the German air arm covering the salient was driven out of the sky, and the former's [German] batteries were nearly crushed by counter-bombardment. ... By early June almost half the German howitzers, light and heavy, were out of action. Hardly one captured Russian gun remained operable. The Third Bavarian Division faced the coming attack with an astonishing total of only nineteen field guns; the second Division up north had lost fifteen of their eighteen medium and heavy howitzers.⁴³

⁴³Leon Wolff, *In Flanders Fields*, (New York: The Viking Press, 1958), 98.

For once, the efforts to destroy enemy artillery had worked. What made it possible was the tremendous amount of artillery available to the British Second Army.

On the day of the assault, a tremendous artillery barrage opened to cover the assault of the infantry. That barrage included counterbattery work. Also supporting the advance on this day was nineteen mines that had been placed by tunneling under the German positions. The explosive power of these mines and their effect on the Germans was historic.

The enemy was in a state of near shock when the British fell upon them. They surrendered en masse, weeping, waving handkerchiefs, grasping the ankles of their captors. Thousands lay beneath the ground, to be forever entombed there. Some of the mine craters were three hundred feet across and seventy feet deep.⁴⁴

Seldom in the history of tactics does one find a physical force so destructive that it immediately overwhelms the enemy. These mines are such a force.

Among all the battles the British fought on the Western Front, Messines is an anomaly. The counterbattery work fits into a natural progression. The staff work, intelligence, and availability of ammunition are all representative of their proper development at this point in the war. But the

⁴⁴*Ibid.*, 102

significance of the counterbattery efforts in this battle are hard to determine. The mines had such overpowering effects on the Germans' tactical position and their morale, that a case could be made that the British might have been just as successful without any counterbattery efforts. Consequently, this battle demonstrates the progression of counterbattery ideas without providing a reasonable conclusion of the worth of those ideas.

The battle for the Messines ridge was a prelude to the battle of Passchendaele. The Germans were determined that the British would not have the luxury of intensive preparation that had preceded Messines. The tactical situation was to their advantage. Whereas before the Messines battle, the Germans were in a salient and susceptible to shelling from all sides, the tables were now turned. The British, in their newly created salient, were susceptible to a pounding. And pound them the Germans did:

The enemy shelled selected areas without let-up, using everything from 8-inchers to "pipsqueaks," and at night he drenched the area with mustard gas. The incessant uproar, the aggravating donning and doffing of gas masks, the lack of sleep, the heavy casualties--all this had reduced Allied artillery personnel to edginess and exhaustion by the 31st.⁴⁵

Under such conditions--the Germans with superior position and a dogged determination to upset British attack

⁴⁵ *Ibid.*, 134.

preparation--the British were unable to destroy or even silence the enemy artillery before the attack.

In addition to this ceaseless harassment by the Germans, there was little confidence in the abilities of the Fifth Army staff, whose responsibility it was to plan and coordinate the main attack.

As an individual he [General Gough, commander of Fifth Army] was liked; yet the responsibility was indeed his for the frequent blunders of omission and commission emanating from his subordinates. All too often, in the past, Fifth Army supplies had arrived later or at the wrong place. Planning was far below the level for which Harington's group [Second Army staff] was famous.⁴⁶

Competent staff work was critical to successful counterbattery work. Coordination between the artillery, the intelligence staff, pilots, and the infantry were all critical to preparing a counterbattery program that would work. The Fifth Army staff's lack of skill did not bode well for the assault.

When the British began their methodical bombardment, they brought to bear a massive amount of artillery pieces and ammunition.

There had never before been such shelling--one gun to every six yards of line--and what with the German batteries replying and the flaming streaks of variously colored signal flares it was perhaps

⁴⁶ *Ibid.*, 128.

the greatest show of fireworks in history. On the 28th counter-battery fire began, but...on the 29th and 30th intermittent fog cloaked the battleground and made it impossible to carry out this final and most important task with much efficiency.⁴⁷

The failure to carry out the counterbattery work was to have dire consequences. The moment the British stepped out of the trenches they were met with daunting German artillery. The lack of capable staff work had caused the counterbattery efforts to prove insufficient. Over the next several months, the British would continue to attack. Slowly, with the sheer weight of numbers, they made eventual progress towards Passchendaele. The failure to use their superiority in numbers more wisely had to do with many factors. Poor counterbattery work was one of them.

The final British battle of 1917 was the battle of Cambrai. This fight is important for two reasons. First, the artillerymen had perfected several aspects of gunnery. Specifically, they adapted survey methods that greatly increased the accuracy of battery location and direction; they had developed methods to measure the muzzle velocity of each piece, thereby increasing their potential to predict the range of a projectile fired from the piece given a specific powder charge and elevation; and they had perfected methods to account for the effects of the weather on the

⁴⁷*Ibid.*, 139.

projectile in flight.⁴⁸ Second, because these new gunnery procedures allowed artillerymen to accurately fire their weapons without first shooting a registration, reinforcing artillery could concentrate in an area without prematurely exposing its presence. Tactical surprise became possible.

The Third Army, commanded by General George Byng, planned and conducted the battle of Cambrai. One of Byng's divisional artillery commanders developed a plan of fire support that emphasized surprise. Byng was impressed.

The possibilities offered by the new tactical methods and the firm rolling downlands of the battle area caught Byng's imagination. The German garrison in the immediate area amount to no more than two divisions which could not be significantly reinforced for forty-eight hours. If surprise were complete and the advance swift it might be possible at last to unleash a large force of cavalry into the enemy rear areas and gain a spectacular success.⁴⁹

This time there would be no long preparatory bombardment. The counterbattery work would not include a preemptory destruction of the enemy's batteries. The ammunition could be conserved to be used massively and instantaneously against a surprised enemy. Byng and his subordinates had developed the methods of counterbattery support to the

⁴⁸Great Britain, *Military Operations, France and Belgium, 1917, History of the Great War*, comp. Wilfrid Miles, vol. 3, (London: His Majesty's Stationery Office, 1948), 12.

⁴⁹Jeffery Williams, *Byng of Vimy*, (London: Antony Rowe Ltd., 1983), 177.

offense that would be used by the British to the end of the war.

The competence of the Third Army staff matched the boldness of the commander's new techniques. The artillery instructions published for the operation were thorough and complete and they faithfully supported the commander's vision of total surprise.

The essence of the operation is surprise. Every possible measure must therefore be taken to conceal the preparation of positions and accumulation of ammunition.

The amount of fire on the front prior to "Z" day will be *absolutely* restricted to the normal daily average of the past three months[Emphasis in original].⁵⁰

Thorough planning and preparation now paid off. Just as the attack started,

with a deafening roar, a thousand guns opened upon the German defences and battery positions between the two canals. ...Escaping the weak and ineffective counter-barrage which fell behind them, the leading waves swept over the German outpost position and reached the Hindenburg front trenches.⁵¹

The surprise was so complete that many of the enemy artillery batteries were captured by the advancing British infantry.

⁵⁰"Third Artillery Instructions No. 18" quoted in *Military Operations, 1917*, vol. 3, 322.

⁵¹*Ibid.*, 50, 51.

But, as had happened at Arras, the victory was short lived. When the infantry advanced to the limit of the artillery's protective range, the artillery had to be moved forward. There had been innovative thinking on this problem before the battle. The "Third Army Artillery Instructions No. 18" addressed the matter in detail, suggesting to subordinate commanders that they send only single heavy pieces forward, thereby reducing the need for engineer work on the move forward and reducing the work load to resupply these single pieces.⁵² The thinking was bold, but the single pieces were ineffective. Besides, the problem of finding the newly arrived German artillery had still not been solved. Consequently, the attack slowed to the stalemate so familiar on the western front.

The spring of 1918 found the Germans making their final offensives of the war. There had been no significant offenses against the British since the second battle of Ypres. Consequently, for all that the British had learned of counterbattery procedures to support the offense, they had no practical doctrine to support a defensive effort against a determined attack. Like all other arms, the artillery was surprised by the German offensives. The response of the British artillery was purely reactive. The

⁵² *Ibid.*

German assault finally lost steam due to the lack of an operational objective. This being the only significant challenge to the British in the defense, a detailed study of what amounted to reactive counterbattery work is not instructive.

The Allied offensives in late summer and early autumn of 1918 were to end the war. The British had learned their lessons of counterbattery well. They would no longer waste ammunition on destructive fire. The battle of Amiens is illustrative of this series of attacks. The Fourth Army, commanded by General Henry Rawlinson, made the attack. Rawlinson secretly concentrated 2,000 guns and other forces. With no registration and no preliminary bombardment, the assault commenced with a firestorm of artillery on the front lines and on the German artillery. It worked.

By 10:30 a.m., the first day's objective line was rapidly secured, except for portions on the extreme flanks. Advances of six to eight miles ruptured the enemy defensive positions and in many cases caused his supporting artillery to be captured.⁵³

This attack would slow just as had the assaults at Arras and Cambrai. However, at this point the Germans had truly used their final reserves. The attacks would never take the form

⁵³William R. Griffiths, *The Great War*, (Wayne, New Jersey: Avery Publishing Group Inc., 1986), 155.

of open warfare, but the Allies were to make steady progress against their enemy until the Armistice on 11 November 1918.

After four terrible years and millions of lives, the British had learned much about total warfare. That artillery could dominate without being decisive had become obvious in the first months of the war. Given their terrible deficit in artillery materiel (a deficit that would not be solved for another two and one half years) the British could do little to learn the practical lessons of counterbattery work. Even when the materiel problem had been solved, it was to take a while before the British finally learned how judiciously to use their growing combat power in trench warfare.

CHAPTER THREE

AMERICA PREPARES TO FIGHT

Until April 1917, the United States of America had been a spectator to the Great War. If Britain had to expand an army that was tailored only to the needs of maintaining its empire, America had to expand from an army that many Americans felt was unnecessary and was therefore very small. This young nation was about to embark on a war that demanded the total mobilization of resources of the major powers of Europe. The degree of mobilization required to support this conflict could only be understood by the veterans of the old Confederacy; and perhaps not even them. Americans could have no idea of the nascent step toward global leadership they were about to take.

The U.S. Field Artillery was completely unprepared to meet the challenge presented by World War I. The number of artillerymen, their training, and their experience were inadequate to meet the needs presented by modern war. Remember that as the war began in Europe, the doctrine of most of the belligerents reflected the romantic notion of the superiority of the will of the infantry. All other arms were ancillary. The Americans had the luxury of almost three years of observing the war without tasting the terrors of combat. Although American artillerymen were deadly

serious about the requirements of modern war (and a quick review of *The Field Artillery Journal* for that time period will show that they were), there were not the resources necessary to develop new doctrine or even to train on the old doctrine.

All of that changed upon the declaration of war. The field artillery found itself in the throes of an expansion unparalleled in its history.

Upon the outbreak of war the Regular Field Artillery was increased from 9 regiments to 21 regiments, calling for a still further distribution of the regular commissioned and enlisted personnel in the Field Artillery.

The disorganization resulting from such an expansion... can well be imagined. The entire enlisted personnel with one year's service was not sufficient to fill the noncommissioned officers grades in the 21 regiments. Moreover, about 400 of these noncommissioned officers were called on as instructors in the officers' training camps just being formed.¹

So limited was the field artillery in personnel that it had neither the option to keep regular forces intact, sufficient regulars to fill out the training centers, nor enough professionals to act as cadre in newly formed units.

As important as the need for artillerymen to form the basis of training for an expanded corps, was the need for

¹Chief of Field Artillery, *Report of the Chief of Field Artillery to the Secretary of War, 1919*, (Washington: Government Printing Office, 1919), 7.

more materiel. At the outbreak of war there were only 930 artillery pieces of all types in the entire army. Most of these weapons were to become obsolete in the conduct of the war.

This shortage of materiel militated more than any other one thing against the proper training of our newly-organized Field Artillery units.

Materiel was improvised in all brigades to make up for this deficiency, but this effort in no sense offset the terrible disadvantage under which these troops labored.²

The lack of materiel furnished from American sources was never rectified throughout the war. After the end of the war, General W. S. McNair, the Chief of Artillery, American Expeditionary Forces (A.E.F.) lamented,

On November 11, 1918, with the exception of twenty-four 8-inch howitzers manufactured upon plans which had been used by the Midvale Steel Co. in the construction of howitzers for the British Government, there was not in the firing line a single field or heavy artillery gun manufactured for us in the United States after our entrance into the war--a period of 19 months. Had it not been for the materiel furnished us by the French and the British,³ it is believed that the war would have been lost.

When the allies had faced their great materiel crisis in 1914, they were forced to solve it while continuing to prosecute the war. America was indeed fortunate to have allies who could help.

²*Ibid.*, 11.

³*Ibid.*, 127.

This combination of circumstances--lack of trained personnel, materiel, and experience in modern war--forced the American artillery to turn to the French for both training and materiel in the theater of operations. The greatest urgency was to train the cannoneers in the technical aspects of modern artillery fire. This training was targeted to all personnel in the firing batteries, and was conducted in several firing centers throughout France. Some time was devoted to training some of the officers in the proper use of artillery at the Division, Corps and Army levels of command. The Army General Staff College at Langres, France focused its lectures on artillery on just that topic. These schools were initially taught by French officers who were eventually replaced by American instructors. Consequently, the majority of training that all American personnel received was based on French doctrine. A study on the use of counterbattery work was integrated into many of the lectures in the curriculum.

The first mention of counterbattery is in Lecture No. 15, explaining the division of responsibilities between the divisional, corps, and army levels of artillery command: "Army Corps Artillery Commanders have charge of the destruction of distant hostile batteries and defensive

works...[Emphasis in original]."⁴ The corps artillery was to be complimented in this regard, if necessary, "Army Artillery Commanders are charged... to provide proper artillery to the subordinate artillery commands when the range of strength of hostile works make it necessary [emphasis in original]."⁵

This, of course, was only an introduction. Lecture No. 28 fully recognized the importance of counterbattery work and dealt with it in greater detail.

The hostile artillery, if uninjured, will stop the [friendly] attacks, either by preventing outlet of infantry, or by inflicting on it such heavy casualties, that the offensive will be checked. When on the contrary the hostile artillery has been destroyed, the victory is near.⁶

The French instructors delivered this lecture to their American students after the battle of Cambrai. In that battle, the British had demonstrated the efficacy of secretly concentrating artillery, keeping it silent, and opening the preparatory barrage all at one time. The British commander forbade the artillery to fire more than

⁴A.E.F., *Artillery and Infantry Training*, Series of lectures developed for the Army Staff College--A.E.F., Langres, France, Lecture No. 15., 5.

⁵*Ibid.*, 6.

⁶A.E.F., *Artillery and Infantry Training*, Series of lectures developed for the Army Staff College--A.E.F., Langres, France, Lecture No. 28, December 24, 1917, 3.

the enemy expected. But the French did not teach this system. Rather, Lecture No. 28 emphasized the value of destroying the enemy's artillery.

Therefore artillery must destroy the enemy's artillery if possible and be ready at least to neutralize it with efficiency at any moment during this destruction fire. Though the intent must always be to destroy a hostile battery, it is not always possible to do so entirely and, in such a case, it can only be neutralized.

The counter battery fire will be arranged so that our artillery has nearly finished its work of destruction before the beginning of our fire against the enemy's defensive positions, but it must nevertheless continue throughout the whole battle.⁷

All of this advice was given, knowing the extensive efforts required to destroy enemy artillery. The lecture went on to state: "An isolated battery can only be destroyed if the target is clearly defined, if the fire is well adjusted during the entire duration of the fire and if one is willing to pay the price (400 rounds of 155). [Emphasis in original]."⁸

Neutralization was not ignored. It was considered of vital importance to continue to protect the infantry in their most perilous hour.

It is ... necessary, especially during the days of the attack to protect the infantry and obstruct the enemy's barrages as much as possible by

⁷ *Ibid.*

⁸ *Ibid.*

paralyzing and blinding its artillery. For this purpose each battery known to be occupied must be submitted to intense fire, previously well adjusted, and controlled during all the action as well as the means of observation will permit. This fire must be able to prevent the usage of the hostile guns entirely and to cut all communications of the Battery.

Gas shells of all calibers will give excellent results if the weather is favorable and if this use is kept up before and during the whole of the attack[Emphasis in original].⁹

Although the French were still pursuing the difficult goal of destroying enemy artillery, they had learned the hard lesson that during the attack the infantry must be protected.

Lecture No. 28 also prescribed procedures to plan, coordinate, control, and execute counterbattery work. The Army Artillery Commander was responsible to organize the assets (group the artillery and allot it to each corps), and divide the battlefield into Corps zones so that the entire Army front was covered. The Corps Artillery Commander was the key player. To him devolved the responsibilities to develop the plan of observation, the list of locations of active hostile batteries, and the execution of the plan. Finally, the divisional artillery commanders would be

⁹ Ibid., 4.

responsible to answer the requests to supplement the fires of Corps artillery should that be needed.¹⁰

The lectures all emphasized the need to observe the adjustment of fires and the need to continue that adjustment throughout the fire for effect. Again, it appears that the French had not yet adopted (or, at least, were not teaching) the improved gunnery techniques that the British had used to such great effectiveness at Cambrai. There was, by this point in the war, adequate gunnery techniques to accurately predict the fall of artillery projectiles. The Americans, at least at the beginning of their training in France were not learning these valuable techniques.

The finest tactics available for counterbattery work and the finest new improvements in gunnery techniques were useless without a valid list of enemy batteries and their locations. The French and the British had learned early in the war that this particular need of the artillery was unique. The intelligence work (performed by what was called the "second section") of the army, corps, and division headquarters was more focused on the enemy's overall capabilities and intentions. To accurately determine the location of all of the enemy's batteries was an intensive

¹⁰ *Ibid.*, 5.

task. Although such a determination was valuable to an overall intelligence picture, it was just one part of a holistic approach. On the other hand, successful counterbattery work was critical to any successful attack, and counterbattery work would not be successful without a valid list of enemy batteries and their locations. Thus was born the Artillery Information Service.

As was taught by the French at the American General Staff School, the artillery of the army and of the army corps had in their support an Artillery Intelligence Service(AIS).¹¹ The purpose of the AIS was,

To furnish the Artillery Commanding authority and the units with all the exact information which they require for the accomplishment of the missions entrusted to them.

To cooperate with all other branches of the Intelligence Service with a view to furnishing the Commanding authority with the most accurate diagram possible of what is known of the enemy's forces and his organizations for offense and defense [Emphasis in original].¹²

¹¹The title of this agency is taken from the French who called their artillery intelligence agency *Service de Renseignement d'Artillerie*. Documents discussing this service refer to it as both the "Artillery Information Service" and the "Artillery Intelligence Service."

¹²A.E.F., *Organization, Administration, and Miscellaneous*, Series of lectures developed for the Army General Staff College - A.E.F. - France., unpublished, lecture No. 36.

The AIS existed to satisfy a specific need. However, the information generated was a very important component of the overall picture. Therefore, it was mutually beneficial for the AIS and the "second section" of the corps or the army to work closely, and to share information and analysis.

What has just been said regarding the obligatory and frequent relations between the C.O. of the 2nd Bureau and the C.O. of the Artillery Intelligence Section shows how essential it is that these officers work side by side in the same place whenever possible. The C.O. of the Artillery intelligence Section has at its [sic] immediate service the information of the 2nd Bureau and vice-versa. The efficiency of the Intelligence Service is the gainer by this.¹³

The practical methods of the AIS were more like detective work than military staff procedures. The personnel of this section were responsible to gather a variety of facts from a variety of media. Some of these facts would directly produce the positive identification and location of enemy batteries. However, for the most part, the Artillery Information Officer had to piece together various bits of information to estimate the locations of German artillery.

The development of information with a view to the accurate determination of data required by the artillery for the carrying out of missions entrusted to it, is a technical role belonging exclusively to the Artillery Intelligence Service;

¹³ *Ibid.*, 2.

its Commanding Officer gathers, coordinates and ascertains all information received:

a)-from the observation means placed at the service of the Artillery or belonging properly to it.

-from the Aviation Service.

-from the Ground observation sections.

-from the sound-ranging sections.

b)-from the 2nd. Bureau [second section] of the General Staff.

After consideration of the information, the Commanding Officer of the Artillery Intelligence Service must deduce the position and activity of the enemy Artillery which it is necessary to follow day by day.¹⁴

The "observation means placed at the service of the Artillery or belonging properly to it" and "Ground observation sections" both referred to terrestrial observation posts. They differ in that the "Ground observation sections" were charged with the primary responsibility to search for enemy batteries and report their observations directly to the AIS. On the other hand, any other means of ground observation would not be controlled by the AIS and their information would, therefore, be less timely and the coordination of their reports with other observations would be precarious. But, the French taught, the AIS should be happy to get any bits of information from any source:

But the Field Artillery and Infantry Observation Posts are sometimes capable of giving

¹⁴ *Ibid.*, 2.

very useful information... An example occurred on the Aisne after the 6th Army Corps had carried the "Chemin des Dames"... The direction of flashes which was carefully determined by Infantry Intelligence Officers, was very valuable in directing investigations and confirming the vague lists of information about the new positions of enemy Artillery, picked up during the first days after the advance.¹⁵

A good detective does not neglect any detail, no matter how seemingly small or insignificant.

But one cannot deny the superiority, from the AIS point of view, of having the observation posts (OPs) working directly for the AIS. The OPs were organized into sections:

A section consists as a rule of 4 observation posts connected one with the other through a telephone exchange under the direction of a specially trained officer. These 4 posts must look over the same zone of enemy territory where batteries are surmised to be. The result to be sought for is to have the same flash located at the same instant by several observation posts.¹⁶

With their superior optical and directional measuring devices, these OPs would report the time and direction of their spottings to one location. If two or more of the posts spotted the same flash, a simple matter of intersection on the map yielded the location of the enemy battery. The more OPs to spot a particular flash, the more confident the AIS became in the accuracy of their spottings.

¹⁵ *Ibid.*, 4.

¹⁶ *Ibid.*, 5.

Also in the employ of the AIS was the sound-ranging sections. By means of a series of microphones located in a line, the sound ranging section could measure the difference in time between when each of the microphones received the sound of the enemy battery firing. Given the precise location of each of the microphones, and given the precise difference in time between when each of the microphones received the sound, the expert section could determine the location of the battery within 20 meters.

AIS also controlled various means of aerial observation. Balloons that were anchored in one location by a cable allowed the observer to watch his zone for the flashes of enemy batteries from a height not normally available to ground OPs. The major drawback to this means of observation was that any enemy activity was seen from an extremely oblique angle. This angle distorted distances and the estimations from the observers in the balloons were normally considered inaccurate. The balloons did not have the versatility of the airplane to get directly over the target. They also did not have the precise measuring equipment available to the ground OPs.

By far, the best source of information under the control of the AIS was the airplane. This machine, still in its infancy, was able to fly over the enemy's territory. If

the enemy batteries could be directly observed by the pilots, they could be immediately engaged by a supporting friendly battery. The pilot could observe and adjust the fire and remain on station as long as was necessary to assure the enemy battery had been neutralized or suppressed, whichever was desired.

But the Artillery Information Officer was supremely interested in the photographs that the pilots had taken.

Photographs are documents of prime importance. The examination of tracks gives us an idea of the life of the Boches. These tracks start out generally from a supply centre, depot, railroad station, cantonment or bivouac and lead to places of assembly, centres of distribution and batteries... On the Somme and on the Aisne it has been possible at times by this method to make up groupings of enemy artillery, to make out the posts of command of the infantry and artillery, to recognize the observation stations at the service of each artillery group.¹⁷

Although all the other means of information gave clues as to the location of the enemy's artillery, it was aerial photographs that confirmed the precise location of the batteries. The correlation of ground observation posts, the examination of prisoners, the estimation of the balloon observer all helped the AIS direct the pilot to a specific location to take his pictures. But it was the pictures that

¹⁷ *Ibid.*

rendered the final affirmation of the disposition and location of the German artillery.

The Americans were preparing to form corps and armies. The general staff officers that would eventually administer these high level units were getting their fundamental instruction at Langres. Those who would eventually become counterbattery officers were no exception. They learned, at this most formative period, that the most effective method of counterbattery was destruction, that neutralization of the enemy's artillery must continue throughout the infantry attack, and that artillery fire must be observed in order to be accurate. They also learned the techniques the French had used in ascertaining the dispositions and locations of the German artillery. How well all of these techniques were to serve the Americans would be demonstrated in the only major battles that American corps and armies were to fight, St. Mihiel and Meuse-Argonne.

CHAPTER FOUR

AMERICA FIGHTS

The U.S. First Army was established on 10 August 1918. Not since the ending of the Civil War had American generals been responsible for such large units in combat. The sheer logistics and administration of armies had to be relearned. Add to this the overwhelming physical and psychological implications of total war and one begins to imagine the complexities these commanding generals and their staffs had to manage. Although riveted to the lessons to be learned by watching the battles from 1914 to 1917, they would have to refine their wartime skills at the cost of American blood in combat. The battles of St. Mihiel and Meuse-Argonne would become the crucibles in which these skills became honed.

In many ways the battle of St. Mihiel was a dress rehearsal for the more intensive ordeal to occur in the Meuse-Argonne. The terrain and the situation were perfectly suited to the training the French had given the Americans. The preponderance of French experience was in trench warfare; the front along the St. Mihiel salient had remained stable since 1914. The French had taught the American artillery information service (AIS) to gather intelligence from many sources to logically deduce the locations of the

enemy batteries. The German side of the St. Mihiel salient had been intensively examined over years. The French had attempted to closely align the American artillery doctrine with their own; they were able to place three of the four corps chiefs of artillery in the committed American forces. Add to this the fact that in opposition to the Germans' 99 batteries, the Americans and their allies were able to mass 2975 guns (approximately 500 batteries).¹⁸ This overwhelming preponderance of artillery combined with the accurate target information available was to make the counterbattery effort successful. The Americans were able to move into the sector and prepare for their attack fully confident that most of the skills the French had taught them were effective.

This sector had been calm for years. "Elaborate reports were on file, which included a list of positions from which enemy batteries had fired, with detailed information as to the sources used to compile the report."¹⁹ But this great amount of information could raise problems as well as solve them. There were more

¹⁸First Army Artillery Study, 4.

¹⁹Lanza, Conrad H., "Counterbattery in the A.E.F", *Field Artillery Journal*, September-October 1936, vol. 26, no. 5, 459.

locations that had been used than there were enemy batteries:

The First Army Artillery S-2 recommended that for the artillery preparation at St. Mihiel, a large number of hostile battery positions be fired upon. He distributed lists of these. Their number was about equal to four times the amount of batteries that the enemy was known to have. The positions were those from which fire had been delivered at some time, and apparently were mostly temporary ones... A compromise was made by [the] S-3. Counterbattery was arranged for on the concrete emplacements, on known battle positions, and on some of the temporary positions which seemed likely to be useful to the enemy.²⁰

The American First Army attacked on the morning of 12 September 1918 after a four hour bombardment that included counterbattery fire. In a lecture given after the war, BG William M. Gruikshank, the chief of artillery for 1st Corps (not the same officer that was present during the battle) reported:

The schedule of fire, counter-battery, bombardment of P.C.'s [command posts], O.P.'s [observation posts], camps and roads was laid down so that no batteries were inactive from the beginning of the preparation until the objectives were reached.²¹

²⁰ *Ibid.*, 459, 460.

²¹ William M. Cruikshank, "Lecture on Explanation of Plan of Artillery for First Corps for St. Mihiel Operations of September 12th, 1918 and Meuse-Argonne Offensive of September 26, 1918., 8.

It worked. All objectives were reached on 12 September with a minimum of loss to the infantry. German prisoners bore testimony to the effectiveness of the fire.

The attack was preceded by a four-hour artillery preparation, in addition to a short trench mortar bombardment. The shooting of the batteries was very good, not only on the front trenches, but also on all communications and rear areas.²²

This great success was followed the next morning by the complete reduction of the salient.

If the battle of St. Mihiel had been uniquely suited to the state of American training and experience, the Meuse-Argonne campaign was to test the flexibility and professionalism of the staff and was to require all of the genius that American generals could bring to bear. In the first place, the Americans had to move two corps from the St. Mihiel salient to the Meuse-Argonne area, a distance ranging between 30 and 50 kilometers. Secondly, although the First Army was to replace units in line, the targets they received were neglected as the Allies believed the Germans were in general retreat. Finally, the move was to begin on the 12th of September; the attack was scheduled to start on the 26th of September. All staffs were busy trying

²² *Ibid.*, 8.

to move this mammoth force and, therefore, had precious little time for planning.

The move was particularly difficult. The logistical effort was impressive:

The relief of the French Second Army involved moving out west of the Meuse two corps, containing eight divisions. With army troops, this amounted to about 200,000 men. To replace these about 600,000 men, with 600 batteries of artillery, trains, 93,000 animals, etc., had to be moved in. Twenty-four ammunition depots, field hospitals, command posts, and other services had to be established. As this had to be all concealed from enemy observation, it was a gigantic task.²³

The road network was primitive and was made particularly more difficult from the damage of four years of war. That the Americans were in position at all is a testament to efforts of the soldiers and leaders of the First Army.

Planning was made even more complicated by a well meaning but misguided devotion to operational secrecy.

When the artillery staff of the First Army started their plans, they knew nothing of [the operation]. They were simply told to prepare for "Operation B." to involve 12 divisions on D day, at X locality, against Y forces. Questions as to how much time was available, what were the enemy forces, and where was the terrain, were answered

²³Conrad H. Lanza, "The Start of the Meuse-Argonne Campaign", *The Field Artillery Journal*, January-February 1933, vol. 23, no. 1, 60.

by the reply, that no information could be given out, as these matter were SECRET. The artillery reported that their plans were based primarily on the enemy and the terrain, and that they could not intelligently prepare a plan without knowing about this. After waiting one day, the needed information was supplied.²⁴

The Army artillery finally received sufficient information to begin realistic planning on 8 September 1918. Between then and 26 September 1918, the First Army had to move the army artillery, the corps artillery, and the division artillery. This force of artillery was the largest that had "ever been under control of one American commander in battle, and the largest ever operating under one plan, under one chief of artillery."²⁵ Additionally, the artillery staff had to plan the upcoming operation based on the information provided by the French Second Army and the intelligence that the Germans were in retreat. The Germans had moved their batteries out of the positions indicated by the French, and they were by no means in retreat.

The optimistic intelligence, the confusion of moving such large forces so far, and lack of time and experience to plan led to a First Army order that provided only general guidance in the use of artillery.

²⁴ *Ibid.*, 62, 63.

²⁵ *Ibid.*, 67.

An Army Artillery order was issued on the 24th, fixing the length of the artillery preparation. H hour being 5.30 A. M., September 26th, a preparation by 25 per cent of the army artillery was to start at 11.30 P.M., the 25th, simultaneously with the preparation of the French Fourth Army on the left, together with a false preparation by more than 300 batteries of the First Army between the Meuse and the Mosell. The first part of the preparation was *exclusive of counter-battery fire, which was to be in addition, and to the extent necessary to meet the enemy's reply to our fire...* At 2.30 A. M. all batteries were to engage in the artillery preparation, according to the plan ... covering a general program of neutralization fire.[emphasis added]²⁶

All of the members of the First Army general staff believed that the enemy would offer minimal resistance; and the advance through the sector would be like the advance through the St. Mihiel salient. Detailed schemes for counterbattery were therefore unnecessary. Indeed, so confident was the First Army in the retreat of the Germans that they provided no artillery support to the infantry after the advance from the first objective line (through Montfaucon).

Beyond this line, the artillery plan did not go, but the troops were ordered to continue on D day, to the [second objective line]... For the second advance the V Corps was designated as the base, this was to be supported by the tanks (none with III Corps), and the division artilleries, without

²⁶"The Start of the Meuse-Argonne Campaign", 70-71.

any prepared plan, according to the orders of local commanders.²⁷

In reality, there was German artillery in the sector. It was unlocated by the French or the Americans, and it was prepared to fight.

At 11:30 P.M. on 25 September 1918, the artillery preparation commenced fire as planned. Initially, 180 batteries participated. At 2:30 A.M. on 26 September 1918, 537 additional batteries joined the barrage. There was so much noise that the return artillery fire of the Germans was unnoticed except by those who were hit by it.²⁸ At 5:30 A.M. the infantry went "over the top." As the Germans had prepared a main battle position several kilometers to the rear of their old position, the initial advance of the infantry went quite well. However, upon running into the enemy's main defensive line, the infantry ran into a hail of artillery fire that stopped their advance. The doughboys made several attempts to achieve the first objective line through Montfaucon, but all failed under the combined effects of the enemy's machinegun and artillery fire.

²⁷Conrad H. Lanza, "The Battle of Montfaucon", *The Field Artillery Journal*, May-June 1933, vol. 23, no. 3, 228.

²⁸*Ibid.*, 229-231.

What happened? Even after the impressive preparation fires, across the front, the Americans had not silenced the enemy's artillery, nor had they broken his will to fight. There were two reasons for the failure. First, the infantry had no way of communicating with the artillery--nor, indeed with anyone above regimental level. Therefore, the artillery assumed that the infantry was proceeding according to the barrage schedule, and was well forward of their actual location. Any fires that would effectively support the infantry were deemed to be behind friendly lines. Second, the initial barrage was effective, but it was only temporary. The preparation the night before and throughout the morning had effectually silenced the enemy, but after the fire had passed the Germans had time to repair the damages.

Before daylight of the 26th our artillery preparation had everywhere destroyed the enemy lines of communications, and both fire direction and command had ceased. After the fog lifted, around 9.00 A.M., an idea of the situation became possible, but the uninterrupted fire of our artillery on Montfaucon up to noon, prevented any change of disposition. After our fire lifted, work was started on reestablishing the telephone net, and artillery OPs. Except for the battalion of the 4th Division to the southeast, there was no interference with the afternoon measures to repair damages. It was fairly well completed when the 79th Division [American] arrived at 5.00 P.M.²⁹

²⁹ *Ibid.*, 244.

This combination of factors, that the infantry could not call for support and that the artillery had ceased to fire upon the enemy, allowed the Germans the time they needed to repair their works and meet the Americans with the superiority of fire necessary to repel the attack on the first objective line.

The fighting for Montfaucon continued through the 29th. The lack of communication between the front and the divisions continued to cause the higher headquarters to direct attacks on the enemy positions. Little by little some light artillery was brought forward, but it was insufficient for the task. Heavy artillery was desperately needed forward.

Liaison between division CPs and the front was still bad. Due to terrific traffic jams, only a small part of the corps and army artillery had arrived close to the front.. Every effort to advance met with severe opposition from machine gun and artillery fire, and the enemy counterattacked frequently.³⁰

The American artillery was in a desperate state of confusion that was shared by all elements that were to the rear of the line.

³⁰ *Ibid.*, 352.

Contrast this confusion to the state of affairs on the German side:

The situation requires that the artillery on both banks of the Meuse River be under one control. Effective 28 September, General M_____ will assume command of all this artillery under direct orders of the Army.

The period, while the enemy has little artillery and munitions available in face of our Meuse West Group (XXI Corps), is to be profitably employed by our artillery. Hostile batteries will be counter-battered; hostile camps and dug-outs will be gassed.³¹

The Americans had squandered their superiority in numbers by committing the artillery to the battle piecemeal. The Germans understood that they must mass where the Americans were weak and continue to punish the Americans as they built their strength in front of Montfaucon. The French teachings of centralized control had fallen on barren minds.

Because of their overwhelming numbers, the Americans were eventually able to bring their heavy artillery forward. Nevertheless, the German artillery was able to continue their punishment of the American front lines. The American artillerymen were trying desperately to silence the German batteries, but they could not find them. One example of the situation occurred in the 35th Division's area on the 29th:

³¹German Fifth Army Order quoted by Lanza in *Ibid.*, 354.

Severe losses now occurred when due to improved visibility, enemy artillery in the Argonne enfiladed our lines with gas and HE Shell. As early as 8.15 A.M., the commander of the 35th Division had ordered his division artillery to counter-battery and stop this fire. An attempt was made to do so, but it was without effect. *It was impossible to locate the enemy artillery.* The I and V Corps artillery undertook to help out in counter-battery by firing at coordinates obtained from air reconnaissances and presumed locations. But the enemy artillery never stopped his shelling.[emphasis added]³²

The AIS was impotent because all of its procedures presumed that there would be time to collect, analyze, and interpret. It takes time to gather and analyze facts, to exactly emplace each of the microphones in a sound ranging section, and to take aerial photos and to develop and analyze them. It takes a stationary front for an intelligence officer to gather all the clues and deduce battery locations. In the Meuse-Argonne there was no time. The AIS was virtually unable to provide any information.

American counterbattery was never successful in these initial days of the battle. The American numbers built up sufficiently in front of Montfaucon, and the Germans started to experience ammunition problems on the evening of the

³² *Ibid.*, 360.

29th. During that night, the Germans withdrew only a few kilometers to reconsolidate their positions and reorganize their defense. The next morning the Americans occupied their first objective line, the line they were supposed to have reached at noon on the 26th. Inadequate planning on the army and corps staffs doomed the divisions and regiments to a muddled success. In the end, it was the blood of the infantrymen, not the munitions of the artillerymen that advanced the line.

Similar battles were fought in similar ways over just a few kilometers of ground over the next few weeks. The Americans were fighting with overwhelming, but inexperienced, forces. The Germans were fighting with only a few determined veterans. While the Americans continued to squander their artillery by keeping it decentralized, the Germans continued to use their paltry numbers of batteries to concentrate and defeat the American advances. The next objective line (through Romagne) was taken weeks later and only after three assaults.

In late October, the Chief of First Army Artillery, Major General Edward F. McGlachlin, was searching for a way to break the deadlock. He correctly identified the problem as having two components. First, the American artillery

could not identify the locations of all of the German artillery and could not, therefore, neutralize their fire. Second, when the infantry did breakthrough, any delay in their advance caused them to lose their protective barrage which was rolling away from them at a prearranged time schedule. The artillery, having no knowledge that the infantry was falling behind, continued to "roll" the barrage forward, not only losing the infantry behind it, but refusing to fire inside of the lines at which the infantry was scheduled to be.

The solution to the first problem was an ingenious use of the American affluence of materiel--even if it was French. The rolling barrage was modified to include two belts. The first belt covered the area from 500 meters to 2000 meters in front of the advancing infantry. The second belt covered the area from 2000 meters to 7000 meters in front of the enemy.³³ As the purpose of this second belt was to attack the enemy's batteries, the planners were allowed to eliminate two categories of terrain from the barrage. They were: any area that could be seen by its observers to be vacant of German artillery and any area that was impossible or improbable to be occupied by an artillery

³³Lanza, "Counterbattery in the A.E.F."

battery. This process of elimination of various parts of the terrain not only conserved ammunition (the affluence in materiel could only go so far), but it allowed greater concentrations to be shot into the possible battery locations.

But as had been seen on the first day of the battle for Montfaucon, the neutralization of the enemy's batteries had to be timed to the advance of the infantry. Thereupon, McGlachlin determined a solution to the second problem. Instead of the artillery firing a series of barrage lines off of a schedule that proceeded stubbornly along, they would build in flexibility with a series of rest and reorganization lines (RRLs). At these RRLs the artillery would continue to fire its protective barrage (both belts), but the barrage would not advance. The infantry would halt if it was on schedule. If they were not on schedule, the infantrymen would be able to regain the barrage at the RRL.³⁴

All of this work had been done by McGlachlin and his staff in the weeks after the First Army had gained

³⁴Conrad H. Lanza, "The Battle of Buzany (Part I)", *The Field Artillery Journal*, November-December 1934, vol. 24, no. 6, 560-562.

Montfaucon and was attempting to gain Romagne. He had anticipated that the continuous attacks at the division and corps level would taper off and that soon the First Army would receive the instructions to move on a coordinated push. He developed these procedures and had the necessary staff work accomplished to have his plan on the shelf when the order for the "big push" came. It came. As he explains in an article in *Infantry Journal*:

All of this work was completed with mutual understanding among those concerned that nothing should be said about it until the event might warrant.

One afternoon well along in October about the 20th, the Chief of Artillery [he refers to himself in the third person] in conference with the Army Chief of Staff, was informed that a representative of the Supreme Command had brought down the plan for the next major operation and asked if we could do our part by October 28.

The Chief of Artillery examined the plans and then, realizing that the conclusions of his own staff agreed very closely with the definite decision of the high command as well as with the tentative decision of the Chief of Staff, with much satisfaction told him the story that has just been related above [that the plans for the new operation with the new procedure had already been completed].³⁵

McGlachlin pulled his plans off the shelf and called a planning conference of the corps chiefs of artillery. The

³⁵Edward F. McGlachlin, "Army Artillery in Meuse-Argonne", *Infantry Journal*, November 1923, vol. 23, no. 5., 547-548.

relationship of the chief of army artillery to the chiefs of corps artillery is not one of direct command. Rather each of these officers were members of the general staff of the army and corps. Their command authority went only so far as the artillery directly under their control. Although McGlachlin could have inserted his new procedures into the army order (thereby impelling the corps chiefs to follow it), he was much more interested in having them adopt the procedures on their own. He was in large part successful.

The center corps... adopted almost in its entirety, the plans suggested to it for the use of its Corps and Divisional artillery, while the right Corps made very minor changes.

The plans for the artillery of the left Corps were radically altered by the French general acting as its chief. His corps artillery fired by successive concentrations on ridge and stream lines and subsequent examination of the ground showed the shot centered there.³⁶

The different use of artillery between I Corps, that chose not to accept McGlachlin's procedures, and those that did has superb comparative value to students of the conflict. The decision by the I Corps chief of artillery had disastrous consequences for the infantrymen of that corps.

The new procedures worked. Looking at the front line traced at the end of the day on November 1st, one clearly

³⁶ *Ibid.* 550.

sees that I Corps on the left advanced less than a kilometer. I Corps' problems began from the start.

At 5.30 A.M. the infantry jumped off. With the exception of the right regiment of its right division (the 80th Division), the I Corps was quickly stopped by severe artillery, trench mortar and machine gun fire.³⁷

The other two corps (V and III corps) seized their objective lines some eight kilometers distant from the "jumping off" line. Of greater significance than the terrain captured was the method in which the Americans overwhelmed the defenders, thereby capturing massive amounts of men and materiel.

The center corps [V Corps] had reached each of its objectives at the hour designated. It had advanced as much as 5.5 miles with small loss, and captured 100 guns, 100 machine guns and 2,000 prisoners, many more than its own killed, wounded and missing, to say nothing of the casualties inflicted upon the Germans.³⁸

Conrad Lanza summed up ;the most compelling evidence in a later article in the *Field Artillery Journal*:

All roads, villages and woods, to a distance of 7 to 10 kilometers back from the front appeared to be covered. With few exceptions telephone lines went out. This was a great handicap to the defense, as it prevented the transmission of orders and of information. The situation was

³⁷Conrad H. Lanza, "The Battle of Buzany (Part II)", *The Field Artillery Journal*, January-February 1935, vol. 25, no. 1, 30.

³⁸McGlachlin, 550.

worse, as due to the shelling received on preceding days, the telephone lines had been so often cut and seriously damaged, that there was a want of necessary material. The personnel had become so disheartened by the constant interruption of lines that many batteries had not attempted to reestablish communications. Knowing little of the progress of the battle, unable to see any targets, subject to a most severe shelling by large caliber pieces, the personnel in large numbers, having nothing to fire at, abandoned the gun positions and sought shelter wherever they could. Many batteries never fired a round. Those that did fire, fired generally on those enemy targets which had been discovered before the battle and for which firing data had been prepared in advance.

At 5.30 A.M. the front line infantry noted the commencement of the Allied rolling barrage and sent up green rockets, calling for the defensive barrage. Due to fog, these signals were not everywhere observed. Some OPs did see the signals but had lost their telephone connection and could not transmit the information.³⁹

This was successful counterbattery work. Not only did the Americans incessantly attack the German batteries, they attacked the entire fire support system. The communications systems from the front to the batteries were destroyed. The communications systems from the OPs to the batteries were destroyed. Even had these communications gone through, it is apparent that the batteries were in no condition to respond. The Americans had developed their own system to meet the demands of open warfare, and it worked.

³⁹Lanza, "The Battle of Buzany (Part II), 38.

This was the beginning of the end. The Americans were to fight more battles and make more mistakes. But the Battle of Buzany had broken the spirit of the Germans. They would still make valiant stands in isolated pockets, but they were at the end of their rope both tactically and strategically. This battle, little known to most Americans was a triumph of ingenuity in combat.

CHAPTER FIVE

CONCLUSION

At the close of 1914, few combatants still held the romantic notion that iron will and tenacity under fire could overcome the awesome power of well-coordinated and well-placed fire. The demands of combat had caused "*offense a outrance*" to be supplanted by "superiority of fire." Since a combatant could not establish fire superiority so long as his enemy could effectively use his artillery, successful counterbattery became a vital component to tactical success in any battle. This study of the British and the American search for effective procedures to silence the German artillery reveals a myriad of successful and failed techniques. We can group these techniques into two categories: the search for successful counterbattery, and, once it was found, the search for the best use of successful counterbattery. To what end was counterbattery to silence the enemy's artillery if there was no corresponding advance of one's overall tactical mission? Learning to exploit successful counterbattery work became just as important as learning to develop successful counterbattery procedures.

LEARNING TO TAME THE ENEMY'S ARTILLERY

Early in the war, artillerymen and their commanders thought it best to eliminate the enemy's artillery before the infantry battle ensued. That such a technique of destruction would not be successful was a hard lesson learned. Just as soon as British industry made available a relatively sufficient amount of ammunition, British commanders would stockpile it before a battle in order to support a program of destruction against the enemy's artillery. From the battles of Loos and Festubert (1915) through the battle of Passchendaele (1917), these artillerymen and their commanders continued to pursue the elusive goal of destruction of as many of the enemy's batteries as possible. This obsession with a preemptory destruction is reasonable through the battle of the Somme. After that battle, the British should have learned that it was a failed technique. They either failed to learn the appropriate lesson or the British Army lacked the institutional procedures to take advantage of these lessons.

The reason that destruction would never substantially contribute to counterbattery work was twofold. First, gunnery procedures had not advanced to the point that artillerymen could accurately predict the fall of all

rounds. Therefore, after an enemy battery was found, an observer (usually a pilot) had to adjust the initial fire and remain on station to observe the fire for effect. Even as gunnery procedures made great improvements (Cambrai, 1917), predicted fire was still only accurate enough to neutralize the enemy batteries. Destructive counterbattery work required extensive assets in terms of ammunition, airplanes, and time. Second, the time required to eliminate any substantial number of German batteries gave the enemy time to reinforce the sector from either home industry or from another, quieter sector. Destruction could never be decisive because it could never substantially affect the relative combat power of the opposing sides on the day of the battle. The enemy artillery would always be in position to respond to the infantry assault. In other words, destruction could only be complete when the reserve could be reached through successful interdiction or deep battle--neither was possible in World War I.

Ironically, neutralization was first used as a measure of last resort. The sole purpose of neutralization was to protect the infantry in their most perilous hour. At the battle of Neuve Chapelle, Haig believed he did not have the resources necessary to destroy the German artillery, and was, therefore, compelled to merely silence the German guns

for the duration of his infantry's attack. It worked. As British affluence in ammunition grew painfully slowly, so did the British idea that they could destroy the German batteries. Neutralization was not tried again until the battles of Loos, Festubert, and the Somme demonstrated that even massive amounts of destructive counterbattery before the battle would not silence all of the enemy's guns on the day of battle. In the battles of Arras, although destruction was still in vogue, neutralization was an integral part of the fires on the day of battle. Once again, it worked. Neutralization was to remain a part of British procedures until the end of the war.

Although they had been trained to do so by the French, the Americans never tried to completely eliminate the enemy's artillery before the battle. Whether they were not in a sector long enough before a battle to do so, or whether they had studied the later British techniques is unclear. At St. Mihiel and the Meuse-Argonne, the A.E.F. began counterbattery just hours before the attack. The disparity of success between different American battles was not due to an emphasis on destruction.

Competent staff work is critical to counterbattery work. From the gathering of intelligence, to positioning of

friendly artillery, stockpiling sufficient ammunition, allocating which units fire which targets, and the timing of the counterbattery program attention to detail is vital. A dedicated, experienced staff is essential. As demonstrated in the battles of Arras, the British First Army combined, collated, and distributed all of the details necessary to fully integrate the artillery into the infantry attack. In contrast, in the battle of Passchendaele the British Fifth Army staff, with overwhelming superiority of numbers of guns over the Germans, was able to confuse the situation sufficiently to squander their advantage. Infantry blood paid for each inch of ground, while the desultory artillery continued to fall harmlessly in the enemy's rear.

In position warfare, intelligence officers had the luxury of time. With time, they could establish flash-ranging OPs, emplace sound ranging stations, send up stationary balloons, and they could send airplanes to take aerial photos and to observe friendly fire. Using all of these assets, they could combine, collate, and analyze information sufficiently to establish a nearly complete list of enemy batteries in a sector. This ability was invaluable in preparation for a big offensive. Without these targets, friendly artillery would not be capable of suppressing enemy artillery during the course of the infantry's attack. The

British developed their intelligence techniques over the course of years of battle. The Americans adopted the French techniques and established the Artillery Information service.

The British, the French, and the Americans were successful in establishing the enemy's artillery order of battle and his battery locations *in position warfare*. After the successful initial friendly infantry assault, when the enemy moved his artillery in sector or reinforced his artillery in response to the initial success, the intelligence officers lost the resource of time. Flash-ranging OPs and sound-ranging sections could no longer be accurately emplaced. Stationary balloons fell behind the battle. Aerial photos could not be developed, analyzed, and distributed in sufficient time to react to a fluid enemy situation. Pilots attempting to find enemy batteries had to deal with an enemy rear area that was being bombarded with friendly artillery. The tell-tell flashes that had previously given away the enemy battery positions were lost in the general confusion of battle. Pilots found very few batteries after the initial change of positions. In short, there was insufficient technology in World War I to find the enemy batteries in open warfare. Such technology was not

developed in that war. Commanders and their artillerymen would be forced to silence the enemy artillery without the advantage of precise knowledge of the its locations. The system was adequate before the battle opened, but was not responsive during the battle.

McGlachlin, the American First Army's chief of artillery, developed a procedure to account for this lack of information on the enemy. By examining all of the terrain in front of the infantry that was within the range of the enemy's artillery, he proceeded to analyze where the enemy batteries could not be, and then to saturate the rest of the areas with his own artillery. Such a procedure required an extensive affluence of artillery materiel, since it included fire on many empty pieces of terrain. More importantly, it also included fire on all battery positions the enemy occupied that could affect the advance of the infantry. In the conduct of battle, such effective procedures such as McGlachlin's are seldom condemned for their inefficiency.

The British at the battle of Passchendaele and the Americans at the early stages of the Meuse-Argonne did not effectively centralize the control of their artillery. Although the reasons were different--the British lost centralized control due to poor staff procedures and the

Americans deliberately decentralized control as they believed the Germans were weak and retreating--the results of the decentralization were the same. Division and lower units had neither the assets to determine the enemy's batteries' dispositions, the power to respond in force to the enemy's massed artillery, nor the staffs necessary to plan, organize, and distribute coordinated artillery programs. Thus the power of the artillery was squandered by committing it piecemeal into the battle.

The British at the battles of Arras, Cambrai, and Amiens and the Americans at the battle of Buzany effectively centralized the control of their artillery. This centralization led to massed artillery fire, better coordination between staff elements, and flexible response as needed. The artillery was available to the force commander where it was needed to gain fire superiority rather than being dissipated across the entire sector.

LEARNING TO EXPLOIT SUCCESSFUL COUNTERBATTERY WORK

Counterbattery work is not an end, it is a means to an end. Any success with new counterbattery procedures is irrelevant if it is not followed by exploitation. Surprise

and integration are the essential tools of successful counterfire.

With the exception of the battle of Neuve Chapelle, all of the British battles until the battle of Cambrai began with a long methodical bombardment. These artillery preparations would last several days. There was no question in the minds of the German leaders of at least the general location of the British main attack. That all changed with the battle of Cambrai. General Byng was adamant that secrecy be maintained. He personally reviewed plans to bring in reinforcing artillery, and he forbade the newly arriving artillery to register. From the commander on down, operational security became a watchword. This penchant for secrecy paid off as Byng caught the Germans and their artillery completely off guard. So successful was he, in fact, that several German batteries were captured by the advancing British infantry--the ultimate success in counterbattery operations. It was surprise that enabled a force to overwhelm its opponent before the enemy could respond.

Counterbattery work could not be exploited unless it was integrated into the rest of the fire plan and into the scheme of maneuver. Indeed, the very concept of

neutralization was founded on the idea that the enemy batteries would be silenced for a limited time; *that time that the infantry was most exposed to the enemy artillery.* Destructive counterbattery programs never worked because they were separate artillery actions not geared to be immediately exploited by the infantry. Beginning with the battles of Arras, the British realized this and included counterbattery work throughout the conduct of the attack. It was only when the attack proceeded beyond the range of the artillery, that it began to slow down and eventually halt. When the artillery was laboriously and slowly brought forward, the attack could resume.

In the initial battles of the Meuse-Argonne, the A.E.F. infantry would sometimes fall behind the artillery rolling barrage. The American artillery was therefore unable to suppress even the enemy direct fire weapons. McGlachlin's new techniques in the battle of Buzany included not only new procedures to silence the German guns, but to help the infantrymen maintain contact with their protective barrage and "rolling" counterbattery program. The designated halts in the progress of the assault allowed the infantrymen to catch up to the barrage if they had fallen behind, and to rest if they had not fallen behind. This integration

between the close support barrage, the counterbattery program, and the infantry assault produced a synergistic effect that overwhelmed the Germans. By its very nature, counterbattery work without infantry exploitation was irrelevant.

CONCLUSION

The study of the development and effects of counterbattery procedures in World War I has been sorely neglected by historians. Indeed, the entire concept of counterfire has been neglected from its inception in World War I through its modern application today. It is almost as if historians have been as captivated by the romance of the infantry experience as were the officers writing doctrine before the war. This thesis has explored the British and the American experience with counterbattery procedures throughout the war. Using the ordeals of these two armies, we have explored the aspects of the birth of counterfire.

But much remains to be done. At the time of this writing, there is no definitive writing on the development of counterfire between the two world wars, there is no definitive writing on the experiences in World War II or Korea. Given today's challenge of low intensity conflict,

some study should be given to the use of counterfire in Vietnam. Such a study would probably yield some principles far different from the evolution of counterfire in high intensity conflicts, and, then again, it may reaffirm other principles. All of these issues provide fertile ground for the future thesis writer.

In many ways, the story of the development of counterbattery procedures in the U.S. Army in WWI is indicative of the broader story of the revolutionary expansion of the American army after the U.S. declared war. An army that had essentially finished the Indian wars years before was only being used to threaten small foreign adventures. Indeed, many Americans could see no need for an army. In less than two years, this sorely unprepared army was to grow from companies and regiments to corps and armies. We have seen the implications just for the artillery. The same growing pains must have been experienced by every branch of service. The hardest lessons to learn were on the general staff. Command and control of any unit in combat is difficult. The complexities grow exponentially as the units grow larger. Perhaps this is why Colonel George C. Marshall was so adamant in his training of staff officers between the two World Wars.

Artillerymen do not generally write history, and historians do not generally concentrate on the experiences of the artillery. This is probably because the central thread of battle is the infantry and, more recently, the armor. However, artillerymen provide support that is vital to the success of the maneuver arms. Stated another way, the maneuver arms will fail without the integrated, effective support of their artillery. Consequently, history must be made more nearly complete with the addition of the contributions of the artillery. Without such an addition, doctrine will be written without a full understanding of the realities of past combat. Without such historical context, present and future doctrines run the same risk of failure as that experienced by the doctrine carried into combat by the soldiers of 1914. The ultimate cost of such a failure is the blood of young infantrymen and tankers.

GLOSSARY

A.E.F.--American Expeditionary Force
A.I.S.--Artillery Information Service
B.E.F.--British Expeditionary Force
C.O.--Commanding Officer
C.P.--Command Post
H.E.--High Explosive
O.P.--Observation Post
P.C.--*Poste Command* (Command Post)
R.F.C.--Royal Flying Corps
R.R.L.--Rest and Reorganization Line
WWI--World War I

BIBLIOGRAPHY

BOOKS

- Balck, Wilhelm, *Tactics*, vol. 2, *Calvary, Field and Heavy Artillery in Field Warfare*, trans. Walter Krueger, (Ft. Leavenworth, Kansas: U.S. Calvary Association, 1914; repr., Westport, Connecticut: Greenwood Press, 1977)
- Balck, Wilhelm, *Tactics*, vol. 1, *Introduction and Formal Tactics of Infantry*, trans. Walter Krueger, (Leavenworth, KS: Press of Ketcheson Printing Co.)
- Chief of Field Artillery, *Report of the Chief of Field Artillery to the Secretary of War, 1919*, (Washington: Government Printing Office, 1919)
- Comparto, Frank E., *Age of Great Guns*, (Harrisburg, Pa: The Stackpole Company, 1965)
- Great Britain, *Military Operations, France Belgium, 1917, History of the Great War*, comp. Cyril Falls, vol. 1, Appendices, "Appendix 15", (London: MacMillan and Co., Limited, 1940)
- Great Britain, *Military Operations, France Belgium, 1917, History of the Great War*, comp. Cyril Falls, vol. 1, (London: MacMillan and Co., Limited, 1940)
- Great Britain, *Military Operations, France and Belgium, 1914, History of the Great War*, comp. J.E. Edmonds, vol. 2, (London: MacMillan and Co., Limited, 1925)
- Great Britain, *Military Operations, France and Belgium, 1915, History of the Great War*, comp. J.E. Edmonds, vol. 1, (London: MacMillan and Co., Ltd, 1927)
- Great Britain, *Military Operations, France and Belgium, 1916, History of the Great War*, comp. J.E. Edmonds, vol. 1, (London: MacMillan and Co., Limited, 1932)
- Great Britain, *Military Operations, France and Belgium, 1917, History of the Great War*, comp. Wilfrid Miles, vol. 3, (London: His Majesty's Stationery Office, 1948)
- Griffiths, William R., *The Great War*, (Wayne, New Jersey: Avery Publishing Group Inc., 1986)

- Fayolle, M. E., *La Guerre Racontee par nos Generaux*, vol. 2, "De la Somme au Rhin", (Paris: Librairie Schwarz, 1921)
- Harington, Charles, *Plumer of Messines*, (London: John Murray, 1935)
- Howard, Micheal "Men against Fire: The Doctrine of the Offensive in 1914", *Makers of Modern Strategy, from Machiavelli to the Nuclear Age*, ed. Peter Paret, (Princeton: Princeton University Press, 1986)
- Horne, Alistair, *The Price of Glory, Verdun 1916*, (London: Penguin Books, 1962)
- Leon Wolff, *In Flanders Fields*, (New York: The Viking Press, 1958)
- MacDonald, Lyn, *They Called it Passchendaele*, (London: Micheal Joseph, ltd., 1978)
- MacDonald, Lyn, *Somme*, (New York: Atheneum, 1989)
- Middlebrook, Martin, *The First Day on the Somme*, (New York: W.W. Norton & Company, Inc., 1972)
- United States, *American Armies and Battlefields in Europe*, (Washington: Government Printing Office, 1938)
- Weigley, Russell F., *The American Way of War*, (Bloomington: Indiana University Press, 1973)
- Williams, Jeffery, *Byng of Vimy*, (London: Antony Rowe Ltd., 1983)

MAGAZINES AND PERIODICALS

- Brooke, A.F., "The Evolution of Artillery in the Great War", *Journal of Royal Artillery* 51, no. 5 (1925)
- Herr, Frederick George, "Field Artillery, Past, Present, and Future", *Field Artillery Journal* 17, (May-June 1927)
- Lanza, Conrad H., "Counterbattery in the A.E.F", *Field Artillery Journal*, September-October 1936, vol. 26, no. 5

- Lanza, Conrad H., "The Artillery Support of the Infantry in the A.E.F.", *Field Artillery Journal* 26 (January-February 1936)
- Lanza, Conrad H., "The Battle of Buzany (Part I)", *The Field Artillery Journal*, November-December 1934, vol. 24, no. 6
- Lanza, Conrad H., "The Battle of Buzany (Part II)", *The Field Artillery Journal*, January-February 1935, vol. 25, no.1
- Lanza, Conrad H., "The Battle of Montfaucon", *The Field Artillery Journal*, May-June 1933, vol. 23, no. 3
- Lanza, Conrad H., "The Start of the Meuse-Argonne Campaign", *The Field Artillery Journal*, January-February 1933, vol. 23, no. 1
- McGlachlin, Edward F., "Army Artillery in Meuse-Argonne", *Infantry Journal*, November 1923, vol. 23, no. 5.

UNPUBLISHED WORKS

- A.E.F., *Artillery and Infantry Training*, Series of lectures developed for the Army Staff College--A.E.F., Langres, France, Lecture No. 15.
- A.E.F., *Artillery and Infantry Training*, Series of lectures developed for the Army Staff College--A.E.F., Langres, France, Lecture No. 28, December 24, 1917
- A.E.F., *Organization, Administration, and Miscellaneous*, Series of lectures developed for the Army General Staff College-- A.E.F., Langres, France, lecture No. 36.
- Cruikshank, William M., "Explanation of Plan of Artillery for First Corps for St. Mihiel Operations of September 12th, 1918 and Meuse-Argonne Offensive of September 26, 1918," First Army Lecture Series, Bar-sur-Aube, France, January 20, 1919.
- McNair, W.S., "Explanation and Execution of Plans for Artillery for St. Mihiel Operation and Argonne-Meuse operations to November 11, 1918," First Army Lecture Series, Bar-sur-Aube, France, December 23, 1918.

National Archives, file 1.2, folder 244, First Army,
"History of First Army Artillery in American Offensive,
January 5, 1919.

Shepherd, W.E., "The Employment of Artillery, 5th Army
Corps, in the Argonne-Meuse Operations," First Army
Lecture Series, Bar-Sur-Aube, France, January 27, 1919.

INITIAL DISTRIBUTION

1. Dr. Jerold E. Brown
Combat Studies Institute
USACGSC
Fort Leavenworth, KS 66027-6900
2. Combined Arms Research Library
U.S. Army Command and General Staff College
Fort Leavenworth, KS 66027-6900
3. Defense Technical Information Center
Cameron Station
Alexandria, Virginia 22314
4. Major David P. Goebel
Center for Army Tactics
USACGSC
Fort Leavenworth, KS 66027-6900
5. Lieutenant Colonel John D. Skelton
School of Advanced Military Studies
USACGSC
Fort Leavenworth, KS 66027-6900